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ACCOUNTS AND PAPERS:

FORTY-ONE VOLUMES.

— (21.) —

RAILWAYS (ACCIDENTS).

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GENERAL REPORT
TO THE BOARD OF TRADE
UPON THE
A C C I D E N T S
WHICH HAVE OCCURRED ON
THE
RAILWAYS OF THE UNITED KINGDOM
During the Year 1878.

Presented to both Houses of Parliament by Command of Her Majesty.



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1879.

REPORT, &c.

TO THE SECRETARY, BOARD OF TRADE.

SIR,

July 1879.

I HAVE the honour to present to the Board of Trade a GENERAL REPORT on the accidents and collisions which have occurred in the working of the railways of the United Kingdom during the year 1878, founded principally on the returns made by the railway companies under the Act 34 & 35 Vict. c. 78. s. 6, and on the reports upon certain accidents and collisions, which have formed the subject of inquiry by Officers of this Department.

Total killed and injured from all Causes in the working of Railways.

The total number of persons returned to the Board of Trade as having been killed in the working of the railways during the year was 1,053, and the number of injured 4,007. Of these 125 persons killed, and 1,752 persons injured were passengers. Of the remainder 544 killed and 2,003 injured were officers or servants of the railway companies, or of contractors; and 384 killed, and 252 injured, were trespassers, and suicides, and other persons who met with accidents at level-crossings or from miscellaneous causes. Of the passengers, according to the returns made to the Board of Trade, 24 were killed, and 1,173 were injured from accidents to trains. In addition to the above, the companies have returned 59 persons killed, and 2,050 injured from accidents which occurred on their premises, but in which the movement of vehicles was not concerned, and which consequently cannot be considered as "Railway Accidents."

Proportion of Passengers killed and injured from all Causes in the working of Railways.

The total number of passenger-journeys, exclusive of journeys by season-ticket holders, was 565,024,455, or about 13,430,000 more than in the previous year. Calculated on these figures, the proportions of passengers killed and injured in 1878, from all causes, were in round numbers, 1 in 4,520,000 killed, and 1 in 322,000 injured.

In 1877, the proportions were 1 in 4,377,727 killed, and 1 in 429,924 injured.

Proportion of Passengers killed and injured from Causes beyond their own control.

The proportion of passengers returned as killed and injured from causes beyond their own control was in 1878 1 in 23,540,000 killed,* and 1 in 481,600 injured.

In 1877, the proportion was 1 in 50,144,876 killed, and 1 in 830,713 injured.

Thus the proportion of passengers returned as killed from causes beyond their own control during 1878 shows a large increase, when compared with that of the year 1877.

The following statement shows the proportion of passengers, returned as killed from causes beyond their own control, to passenger-journeys for the three years ending 1849, the four years ending 1859, the four years ending 1869, the four years ending 1873, and the four years ending 1877, and for the year 1878 :—

		Number of passengers killed from causes beyond their own control, from accidents to trains.	Number of passenger- journeys.†	Proportion returned as killed (from causes beyond their own control) to number carried.
1847-49	- -	36	173,158,772	1 in 4,782,188
1856-59	- -	64	557,338,326	1 in 8,708,411
1866-69	- -	91	1,177,646,573	1 in 12,941,170
1870-73	- -	142	1,589,912,975	1 in 11,196,570
1874-77	- -	152	2,074,721,360	1 in 13,650,000
1878	- -	24	565,024,455	1 in 23,540,000

ACCIDENTS INQUIRED INTO.

Excluding 10 inquiries under the head of miscellaneous, 108 train-accidents on railways have formed subjects of inquiry, and have been reported on, by officers

* If the journeys of season-ticket-holders are included the proportion would be 1 in 29,000,000.

† Exclusive of journeys by season-ticket-holders, which has been estimated for the past year at 110,000,000.

of the Board of Trade during the past year, against 146 for the previous year, 1877.

The investigated train-accidents, in which loss of life occurred to passengers from causes beyond their own control, were five in number.

They were as follows, namely :—

One, on the London and North-Western and Great Western Joint Line, on the western side of Chester Central station, by which 2 passengers were killed and 16 injured, appeared to have resulted from the facing-points having been shifted whilst the train was passing over them, causing the fifth, sixth, and seventh carriages to be dragged off the rails.

One, on the London, Chatham, and Dover Railway, at Sittingbourne station, by which 5 passengers were killed and 80 injured, was due to the shunting by mistake of some trucks of a down goods train across the up main line, in front of a fast up passenger train as it was travelling at a speed of upwards of 40 miles an hour.

One, on the Cork and Macroom Railway, near Ballincollig, by which 3 passengers and the driver and fireman were killed, and 50 passengers were injured, was caused by the train leaving the rails on a curve where the sleepers were in a very defective state.

One, on the Dublin, Wicklow, and Wexford Railway, near Glenageary station, by which 1 passenger was killed and 15 were injured, was owing to the fracture of a coupling of a goods waggon, and the running back of a portion of the waggons, which came into collision with a passenger train.

And one on the Taff Vale Railway, at Rhondda Branch junction, by which 13 passengers were killed and 93 injured, was due to the mistake of the signalman in allowing a train of empty carriages to be shunted back through a curve, the hinder carriages coming into collision with a passenger train at the junction with the main line.

The number of inquiries into accidents are classified as follows for the past year, and the corresponding cases for the previous eight years are given, for the purpose of comparison.

	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	
	9	19	21	24	18	14	23	21	12	from engines or vehicles meeting with, or leaving the rails in consequence of, obstructions, or from defects in connexion with the permanent way or works.
	10	22	17	23	13	13	12	11	19	from boiler explosions, failures of axles, wheels, tyres, or from other defects in the rolling stock.
	—	2	7	5	—	2	3	5	2	from trains entering stations at too great speed.
	7	9	22	18	9	10	3	5	3	from collisions between engines and trains following one another on the same line of rails, excepting at junctions, stations, or sidings.
	18	19	32	20	22	14	19	15	8	from collisions at junctions.
	54	63	91	98	75	67	49	44	38	from collisions within fixed signals at stations or sidings.
	3	2	5	3	6	7	2	3	3	from collisions between engines or trains meeting in opposite directions.
	1	—	—	3	1	1	1	—	1	from collisions at level-crossings of two railways.
	14	12	34	36	17	25	32	27	11	from engines or trains being wrongly run or turned into sidings, or otherwise through facing-points.
	6	11	9	11	7	8	5	13	11	on inclines.
	9	12	8	6	—	3	1	11	10	miscellaneous.
Total	131	171	246	247	168	164	150	155	118	

Whilst the numbers of investigated accidents were, respectively, 131 for 1870, 171 for 1871, 246 for 1872, 247 for 1873, 168 for 1874, 164 for 1875, 150 for 1876, 155 for 1877, and 117 for 1878, the numbers of passengers killed in those accidents varied during the same years, from 66 for 1870, to 12 for 1871, 21 for 1872, 43 for 1873, 80 for 1874, 19 for 1875, 35 for 1876, 16 for 1877 and 30 for 1878; and the numbers of passengers and others, exclusive of servants, injured by these accidents were, for the several years, 1,084, 821, 1,183, 1,379, 1,373, 1,043, 1,101, 563, and 992.

The passengers killed in the accidents, which were investigated in the past year, comprised 24 killed, as before mentioned, from causes beyond their own control, one in attempting to get into and four in getting out of trains, and one by putting his head out of a carriage window in a tunnel, besides one other person who was run over at a level-crossing.

From the above table, it will be seen that the number of inquiries show a large decrease as compared with the preceding eight years, and that the number of accidents from collisions has also much decreased. It is not unreasonable to conclude, especially considering the increased length of railway opened and the large increase in the traffic during this period, that this decrease is due in a great measure to the recent extension of the improvements in interlocking and concentration of points and signals, and of the working of the traffic on the absolute block system.

It will be observed that of the above 108 train-accidents for 1878, (ten of the casualties under the head of Miscellaneous being excluded from consideration,) 53, or about 49 per cent., were cases of collision under different classes, in addition to certain collisions which occurred on inclines or in connexion with facing-points; whilst 11, or 10 per cent., were from passenger trains being wrongly turned into sidings, or otherwise through facing-points; 12, or 11 per cent., were from engines or vehicles meeting with or leaving the rails in consequence of obstructions on, or defects in, the permanent way; 19, or 18 per cent., were from boiler-explosions, or failures of axles or tyres, or from other defects of rolling-stock; and 11, or 10 per cent., were on inclines.

Classification of Accidents and Collisions inquired into.

A classification of the accidents and collisions which have formed the subject of inquiry, similar to those made in previous years, will be found in Appendices Nos. 1 and 2 of this Report, but it has not been thought necessary to make, as hitherto, an analysis of the reports of the inquiries, as they are appended to the returns of accidents presented quarterly to Parliament, and may readily be referred to.

In the following pages a summary of the several accidents will be given under the respective classes to which they belong, with remarks as to the causes which led to them, and as to the measures necessary for prevention of like accidents in future.

A.—Accidents from Engines or Vehicles meeting with Obstructions or leaving the Rails, in consequence of Defects in connexion with the Permanent Way or Works.

Twelve investigated accidents in this class occurred from obstructions on, or defects in, the permanent way or works, resulting in the death of 3 passengers and 3 servants of companies, and injury to 83 passengers and 5 servants of companies. In eight cases there was defective maintenance, and in three cases defective construction of road or works. In one case there was the want of a locking-bar. In two cases there was negligence of the servants, and in two cases excessive speed having regard to the condition of the permanent way.

The most serious accident of this class, in which three passengers and the engine-driver and fireman lost their lives and 50 passengers were injured, 16 having limbs fractured, was attributed to the defective state of the sleepers, the fastenings not having sufficient hold to resist the pressure of the engine wheels in running round a curve. The sleepers have since been renewed, and the line made fit for traffic. The condition of this line was made the subject of special inquiry immediately after the occurrence of the accident, and the company at the instance of the Board of Trade restricted the speed of the trains during the repairs which it was pointed out were necessary to make. Another accident, in which, happily, no one was injured, occurred from a similar cause, namely, the decayed state of the sleepers and the absence or rottenness of many of the wedges, which allowed the rails to spread in a curve during the passage of a mixed passenger and goods train. The condition of this line was also made the subject of special inquiry, and the speed of the trains reduced until the line was put into proper condition.

One accident, by which 19 passengers and 4 servants of the company were injured, was attributed to the train passing at too high speed through a very sharp and not well

laid in curve. Two cases, in which passenger trains left the line, were due to some obstruction having been placed on the rails. One case was that of a train getting off the line when passing through facing-points, which were being renewed and did not close properly; one case was due to the want of a locking-bar; one case, by which three passengers were injured, was due to a broken rail which had been several times turned; one case in which five passengers were injured, was caused by the train passing over some broken rails; one accident, in which three passengers were injured, was due to the line being under repair; and two cases occurred of trains leaving the rails in consequence of the permanent way having been put out of order by preceding trains.

Of casualties reported to the Board of Trade, including those investigated by their officers, there were 76 cases of passenger trains, or parts of such trains, leaving the rails; and 15 cases of goods trains, or parts of them, leaving the rails. There were also 169 cases of trains coming into collision with obstructions, including cattle; and 57 cases of trains running through gates at level-crossings; as well as 19 cases of slips in cuttings or embankments, and 490 cases of broken rails.

B.—Accidents from Boiler Explosions, or from Failures of Axles, Wheels, or Tyres, or from other defects in Rolling Stock.

Under this head, 19 accidents, occasioning the death of one passenger and injury to 41 passengers and 21 servants of companies, were inquired into. Of the number of cases, six were due to the fracture of axles, two to the fracture of tyres, four to the fracture of couplings, two to the fracture of crank pins of axles of engines, one to the loss of the springs of a carriage, one to the fracture of the axle-box of a waggon. Two cases of explosions occurred, one of which caused injury to three of the servants of the company.

Twelve out of the 19 cases were attended with personal injury, the most serious being that due to the fracture of a coupling of a waggon in a goods train, the remaining waggons being run into by a following passenger train, by which one passenger was killed and the engine-driver injured. One case, in which about six passengers were injured, was due to the breaking of an axle of a coal waggon in a goods train, some of the waggons of which fouling the down main line were run into by the down Scotch express, which was entirely thrown off the rails, and its engine being foul of the up line, was immediately after run into by an uppassenger train. The vacuum break of the express, which was applied, reduced the speed before the collision, or very serious consequences would probably have ensued.

In one case, that of an express train from Dover, in which the axle of the tender wheel broke and threw one vehicle off the rails, the effect of the *automatic* action of the break reduced the speed of the train from 40 or 45 to 25 miles an hour before the leading van came into contact with the abutment of a bridge on the railway. In another case, where five post office officials were injured, the engine and tender, owing to the breaking of a coupling, separated from the carriages, which afterwards came into collision with the engine and tender; the train was fitted with the vacuum break, and the case affords a striking illustration of the value of an *automatic* continuous break, which would at once have arrested the course of the carriages on the separation occurring.

Another case, in which the tyre of a wheel in the tenth vehicle broke, and the train ran for three miles afterwards before it was observed by the engine-driver and before it was stopped, shows the importance of securing the tyres in such a manner as to prevent the tyres from leaving the wheel in case of fracture. This has been repeatedly pointed out by the Board of Trade. In this instance had the train been fitted with continuous breaks, the train might have been stopped sooner. Two other cases exemplified the danger of running mixed trains, especially when made up with the goods waggons in front.

The total casualties reported to the Board of Trade comprise, as will be seen by the return of accidents, 540 cases of axle failure, 1,034 cases of tyre failure, 20 cases of wheel failure, 16 cases of coupling failure, 10 cases of the failure of parts of locomotive boilers, and 5 cases of failure of machinery, springs, &c. of engines.

C.—Accidents from Trains entering Stations at too great Speed.

Only two cases were inquired into under this head; in one case one passenger and in the other case 13 passengers were injured. In both cases the want of sufficient care on the part of the driver was evidenced.

Eighteen other casualties of a similar nature were also reported to the Board of Trade, but were not investigated, as the causes were apparent from the returns sent in by the companies.

The small number of these casualties is satisfactory, and reflects credit upon the care which, as a rule, is displayed by the engine-drivers in the discharge of their duties. The use of more effective and in some cases of continuous breaks in the hands of the drivers, and improved station arrangements, doubtless contributed to the comparative immunity from accident under this head.

D.—Collisions between Engines and Trains following one another on the same Line of Rails, excepting at Junctions, Stations, or Sidings.

The three investigated accidents in this class show a decrease as compared with the previous year, both as regards the number of accidents and injuries, five passengers and two servants of companies only having been injured.

Two of the collisions appear to have been caused by the want of attention on the part of the servants of the company. The third would seem to have been due to the fracture of a coupling of a waggon of a goods train, owing to which two waggons were left on the line and were run into by a following train, causing injury to two servants of the company. This could not have happened if the traffic had been properly worked on the absolute block system.

E.—Collisions at Junctions.

Nine investigated accidents occurred in this class, namely, collisions at junctions, occasioning the death of 13 passengers, and injury to 318 passengers and 6 servants of companies. In 8 cases there was negligence or want of care on the part of the officers or servants of the companies. In 2 cases there was defective telegraph working. In 2 cases there were insufficient or inadequately enforced regulations. In 3 cases defective signal or point arrangements. In 2 cases there was inadequate or unsuitable break-power. And in 2 cases insufficient or defective accommodation for the requirements of the traffic.

Of these 8 collisions, 2 occurred on the Great Eastern Railway, 2 on the Midland Railway, one on the London and North-Western Railway, one on the London, Brighton, and South Coast Railway, one on the North British Railway, one on the South Eastern, and one on the Taff Vale Railway.

The accidents in this class, though less in number than in the preceding year, were in several cases attended with serious, and in two cases especially with disastrous results. One of these, which occurred on the Great Eastern Railway at Stratford, during a dense fog, by which 17 passengers were injured, was occasioned by the mistake of the fog-signalman. Another, on the same railway, at Stepney junction, by which 24 passengers were injured, was due to the signal-arm not obeying the motion of the lever. One, on the Midland Railway, at Settle junction, by which 6 passengers and 4 servants of the company were injured, was due, as in another case enumerated in this class, to the practice of permitting trains from more than one direction to approach a junction at the same time. One case on the London, Brighton, and South Coast Railway at the Bricklayers Arms junction, by which 168 passengers were injured by an up excursion train coming into collision with two light engines, was due to the practice followed by the South Eastern Railway Company of passing some of its light engines and empty passenger trains between London Bridge and the Bricklayers Arms station by way of this junction. One case occurred on the South-Eastern Railway, at Charlton station, in which the driver of a down train mistook the green head-light on the engine of the up train for what he thought was a green hand-lamp signal. The use of these hand-lamps is a practice which should not be allowed to set aside the arrangement of signals and interlocking of points. Another case, by far the most serious in its consequences of any which occurred during the year, by which 13 passengers were killed and 93 injured, took place on the Taff Vale Railway at the Rhondda Branch junction. This accident resulted from the unfortunate mistake of a signalman, and from the mode employed in working the traffic on a wrong line of railway, which was not provided with out-of-door signals to check any mistake which a signalman might make.

In 4 of the cases included in this class, if the trains had been fitted with *continuous breaks* under the control of the engine-driver, the collisions might probably have been altogether avoided or greatly mitigated in their effects.

F.—Collisions within fixed Signals at Stations or Sidings.

There were 38 investigated accidents under this class, or 6 less than in the previous year, all of which occurred within fixed signals at stations or sidings, and caused the

death of 5 passengers and 3 servants of companies, and injury to 395 passengers and 27 servants of companies. This class of accidents continues to be quite as formidable as in previous years, containing no less than 35 per cent. of the 108 investigated train accidents. Notwithstanding the decrease in the number of collisions, 38 as against 44 in the previous year, the number of passengers killed and injured show a large increase; it is stated, however, with regard to the passengers injured, that except in a few cases the injuries were comparatively slight.

Out of the 38 cases inquired into, there were no less than 36 cases of negligence or mistake on the part of the officers or servants; 10 cases of defective system for securing intervals of space between trains, or want of block-telegraph working; 9 cases of defective arrangements of signals or points, or of want of locking apparatus or safety points; 18 cases of inadequate or unsuitable break-power; 6 cases of insufficient or inadequately enforced regulations; 3 cases of insufficient accommodation; 6 cases of foggy weather; and 7 cases of excessive speed.

Thirteen of the cases were primarily due to the mistakes or incaution of engine-drivers in working their trains or to disregard of signals; 15 to the mistakes or neglect of signalmen; 2 to the inattention of guards; 3 to the neglect of shunters; amongst other causes, one was due to the use of wire-locking instead of rod-locking of points, a matter to which the attention of the railway companies was specially called in the Report of last year; 2 to defective station arrangements; one to the improper coupling of a waggon in a mixed train; 6 were partly due to the want, or the proper working, of the block-telegraph system; 3 cases might have been prevented by proper interlocking of points and signals; 3 cases might have been prevented by interlocking the points and signals with the telegraph instruments for working the block system; one case was partly due to the continuous breaks not being available for the use of the driver as well as of the guard; in one case had the driver possessed control over a continuous break applying to the engine and tender as well as to the vehicles composing the train, instead of to only four of the vehicles, the force of the collision might have been much reduced; in one case the vacuum break failing to act when put on, furnished a strong argument in favour of automatic breaks; in 16 other cases the collisions might have been either altogether prevented or the evils mitigated had the train been fitted with continuous breaks in the hands of the driver. In 2 of the latter cases, both occurring on the same day, namely, one at the Citadel station at Carlisle, and the other at Drumburgh on the North British Railway, no less than 107 persons were injured, though not severely, it is stated, both of which might have been prevented had the trains been provided with continuous breaks. The lamentable accident which occurred on the London, Chatham, and Dover Railway at Sittingbourne, by which an up train, timed to travel at a speed of 40 miles an hour, came into collision with some trucks which had been shunted by mistake across the main up line as the train was approaching, would have been rendered impossible had the points and signals been properly interlocked; and the very serious effects of the collision might have been greatly mitigated had the train been provided with continuous breaks in the hands of the driver.

Eighteen companies were concerned in the 38 accidents, which were distributed amongst them as follows:—8 to the London and North-Western, 3 to the Caledonian, 3 to the Great Western, 3 to the Lancashire and Yorkshire, 3 to the Midland, 2 to the North London, 1 to the Belfast and County Down, 1 to the Glasgow and South Western, 1 to the Great Northern of Ireland Railway, 1 to the London, Brighton, and South Coast, 1 to the London, Chatham, and Dover, 1 to the Manchester, Sheffield, and Lincolnshire, 1 to the Metropolitan, 1 to the Metropolitan District, 1 to the North British, 1 to the North Eastern, 1 to the Rhymney, and 1 to the South Eastern Railway.

G.—Collisions between Engines or Trains meeting in opposite directions.

There were three investigated accidents in this class, resulting in the death of one servant of a company and in injury to one passenger and two servants of companies. In all three cases there was negligence; in two cases there was a defective system for securing intervals between trains, in two cases defective arrangements of signals and interlocking arrangements, in one case want of break power, and in one case defective maintenance of road.

In one case the accident was primarily caused by the failure in working of the up distant-signal; in the second case a special goods train came into collision with a ballast

train which had been taken on to the wrong line without the knowledge of the signalman, the points and signals not being interlocked; and in the third case the accident was due to the driver not having his train under proper control when approaching the station, and so overrunning the station loop.

H.—*Accidents or Collisions on Level Crossings of Railways.*

No accident was inquired into under this class.

I.—*Accidents in consequence of Engines or Trains being wrongly turned into Sidings or otherwise through Facing Points.*

There were 11 investigated accidents in this class, at facing points, which were the occasion of death to two passengers and one servant of a company, and injury to 55 passengers and 8 servants of companies. In every case there was negligence or mistakes of servants. In six cases there were defective signal or point arrangements or want of locking apparatus, in three cases there were insufficient or unsuitable break power, and in one case defective maintenance of road.

Six of these collisions were primarily due to the mistakes or neglect of signalmen. Two of the six cases, in one of which 2 passengers were killed and 15 were injured, were due to the points being shifted before the whole of the carriages of the train had passed over them, showing the necessity of locking-bars. In two other of the six cases the interlocking gear was out of order. In four cases collisions were due to neglect on the part of the ground pointsman to attend properly to the points under his charge, showing the necessity of general adoption of the interlocking system. In one case the accident was due to the forgetfulness of an engine-driver. In one case, in which 10 passengers were injured, had the continuous breaks been in working order, the accident would probably have been prevented. In another case, in which 5 passengers were injured, the application of continuous breaks reduced the speed to three or four miles an hour. In another case, in which 17 passengers were injured, if there had been continuous breaks throughout the length of the train under the control of the driver, instead of two sections of continuous breaks at its extremities, the collision might probably have been prevented.

J.—*Accidents on Inclines.*

There were 11 accidents in this class, viz., on inclines, which were the occasion of death to 5 servants of the companies, and injury to 71 passengers and 8 servants of the companies. In seven cases there was negligence or mistakes of the companies servants; in one case there was a defective system for securing intervals between trains; in one case there was inadequately enforced regulations; in four cases there was defective signal or point arrangements; in one case inadequate accommodation, in one case defective construction of road; and in three cases fracture or unloosening of couplings.

The worst of these accidents, that on the Brecon and Merthyr Railway, by which four servants of the company were killed and four injured, occurred to a mixed mineral and goods train with three engines, which became unmanageable and obtained a speed of 60 miles an hour, and ran off the line at a curve and over a road bridge. This accident was caused by the driver starting from the preceding stopping place at such a speed as to prevent the brakesmen pinning down the whole of the breaks on the waggons. Two cases, in which 10 passengers and 3 passengers respectively were injured, were, in each case, caused by the pilot engine running into the train it was to help up the incline. One case, causing injury to 30 passengers in an excursion train, was due to the uncoupling, before the guard had put down his breaks and sprags, of 13 loaded trucks, which ran back and came into collision with the excursion train. One case, causing injury to 12 passengers, was caused by the neglect of the guards to put the breaks on the carriages before uncoupling them from the two engines with which they afterwards came into collision on a descending gradient. In one case four passengers were injured by some trucks, detached by the breaking of a link of a goods train, running back and coming into collision with a following passenger train. Three other cases in which trains became divided, were fortunately unattended with personal injury. In one case, upon a mixed train being uncoupled, part of it ran back, owing to the block of the breaks being frozen and incapable of action; and in another case a passenger train, unable to get up an incline, was run into by another passenger train at the junction, to which it had slipped back, the result being injury to three passengers and one servant; had the train been fitted with continuous breaks placed under the control of the driver, he could have prevented it

slipping back. In one of the preceding cases, if the train had been provided with continuous breaks, the effects of the collision would have been mitigated; and in another of those cases due to the couplings breaking, if the train had been provided with an automatic continuous break, the run back would not have taken place; and in two of the cases, if the usual siding or station catchpoints had been provided, the carriages would not have run back.

M.—Miscellaneous.

In this class are enumerated six cases of fatal accidents, inquired into, to passengers in getting out of, or attempting to get into, trains in motion. One fatal accident at a level-crossing. One case in which a passenger looking out of a carriage window, was killed by his head coming into contact with the side of the tunnel. One case in which an under-guard looking out of the window, was killed by his head striking against a scaffold pole erected for the repair of a bridge. One inquiry was into an accident to a train, on the Metropolitan District Railway, caused by the guard in the rear carriage applying the sectional breaks by which the train became divided. This accident furnishes an example of the advantage of continuous breaks in the hands of the driver over those commonly termed sectional breaks. One inquiry was made into the circumstances under which a collision between two passenger trains was avoided on the Metropolitan District Railway by the prompt action of the Westinghouse air continuous break. This case is another evidence of the expediency of having all trains fitted with efficient continuous breaks under the control of the driver.

GENERAL SUMMARY.

The investigated train-accidents for 1878 were 108 in number, against 146 for 1877, 149 for 1876, 161 for 1875, 168 for 1874, 241 for 1873, and 238 for 1872; and the usual causes contributed or combined to produce them in the following proportions for each of the seven years :—

Causes.	Nos. of Cases.						
	1872.	1873.	1874.	1875.	1876.	1877.	1878.
Fracture or unloosening of couplings -	4	4	5	5	3	8	9
Defective maintenance of rolling-stock -	11	15	5	11	8	7	6
" " of road or works -	16	24	13	20	19	21	12
Defective construction of rolling-stock -	11	12	8	6	6	10	8
" " of road or works -	4	6	4	4	11	13	9
Insufficient or defective accommodation for the requirements of the traffic -	13	37	18	23	23	16	6
Insufficient establishment, long hours, or inexperienced servants -	7	17	1	12	8	7	2
Inadequate or unsuitable break power -	8	12	6	10	21	27	28
Defective arrangement of signals or points, or want of or defective locking-apparatus, or want of safety-points or locking-bars or bolts -	71	78	49	53	48	41	21
Insufficient or inadequately enforced regulations -	11	33	24	37	29	53	11
Defective system for securing intervals between trains, or want of telegraph-communication or of block-system -	42	59	36	43	25	23	18
Negligence, want of care, or mistakes of officers or servants -	180	182	126	126	101	101	81
Excessive speed, having regard to engine, road, or other circumstances -	16	12	9	13	18	23	12
Foggy or stormy weather, or snow-storms -	14	22	28	9	5	9	8

The number of causes which contributed to the investigated accidents of the past year are considerably less than those of the previous year, 1877, the number of accidents inquired into having decreased by fully one fourth; there is at the same time a very marked decrease in the number of instances in which accidents were due, amongst

other causes, to defective signal and point arrangements, or to defective system for securing intervals of space between trains. The cases of insufficient or inadequately enforced regulations is also much less. The cases due to foggy or stormy weather, or cases in which the insufficiency of break-power contributed to the accidents, remain about the same. Amongst the latter cases, however, as in the past year, those cases have been included, in which it was reported that had continuous breaks been available on the trains the accident might have been mitigated in its effect or have been altogether averted.

The principal causes which led to the accidents appear to have been—

- (1.) Negligence, want of care, or mistakes ;
- (2.) Inadequate or unsuitable break-power ;
- (3.) Defective arrangements of signals, points, &c. ;
- (4.) Defective system for securing intervals of space between trains ;
- (5.) Defective maintenance of rolling-stock or road ;
- (6.) Excessive speed ; and
- (7.) Insufficient regulations ;

the most serious being that of negligence or want of care or mistakes of officers and servants, inadequate or unsuitable break-power, and defective arrangement of signals and points.

It appears that of the 108 train accidents investigated, the largest number occurred on the following railways, viz. :—

12 on the Caledonian ;	847 miles.
12 on the London and North-Western ;	1,676 „
11 on the Great Western ;	2,139 „
5 on the Lancashire and Yorkshire ;	455 „
5 on the Metropolitan ;	14 „
5 on the Midland ;	1,295 „
4 on the Great Eastern ;	877 „

The remaining accidents occurred on other railways, but not exceeding three on any one system.

TOTAL ACCIDENTS TO PASSENGERS AND SERVANTS.

It will only be necessary in this place to refer in general terms to the accidents which occurred on railways during the past year, as the information may be obtained from the returns already made to Parliament.

It will, however, be useful to compare the numbers killed and injured during the year 1878 with those of the previous year 1877.

By accidents to trains, rolling stock, permanent way, &c., 24 passengers and 15 servants were killed, and 1,173 passengers and 156 servants were injured. There was, during the year 1878 as compared with the year 1877, an increase in the number of passengers killed of 13, and in the number injured of 509 ; and there was a decrease in the number of servants killed of 7, and an increase in the number injured of 2.

By the accidents from other causes, including accidents from their own want of caution or misconduct,* 101 passengers and 529 servants were killed, and 579 passengers and 1,847 servants injured. This was a decrease in the number killed of 14 passengers and 91 servants, and in the number injured of 40 passengers and 162 servants.

In these numbers are included 61 deaths and 459 injuries to passengers in getting in and out of trains, which, as compared with the previous year, show a decrease of 2 passengers killed and of 41 injured. 30 passengers killed and 19 injured in crossing the lines at stations, or a decrease of 7 in the number killed. 1 passenger was killed and 42 injured by the closing of carriage doors, against 39 injured in the previous year.

* It has not been deemed right to include among these figures, although returned by the several companies, the number of servants killed and injured whilst employed in the workshops or warehouses, or in loading goods in yards of the companies, and consequently not employed in the working of railways. It may be stated, however, that the number of railway servants thus killed amounted to 40, and the number of those injured to 1,795.

Amongst other classes of servants, 127 permanent-way men, and 63 porters, 47 breaksmen and goods guards, 45 shunters, 19 engine-drivers, 24 firemen, &c. were killed.

There were 44 killed and 313 injured whilst employed in coupling or uncoupling of trains, 36 were killed and 208 injured in getting on or off engines, 51 killed and 147 injured by being caught between trains, 24 killed and 86 injured by falling between trains and platforms, 86 killed and 126 injured whilst working on the permanent way and sidings, 134 killed and 173 injured whilst walking, crossing, or standing on the line on duty, besides others killed and injured employed in various other ways.

These accidents to the servants of the companies employed in the maintenance of the railways and variously in the working of the traffic, appear to be due in most cases to their want of caution, induced perhaps by familiarity with danger.

Accidents to Persons other than Passengers or Servants of Railway Companies.

Trespassers, as usual, form the largest class under this head; of these 238 were killed and 147 injured during the year. This large total of 385 persons killed or injured, including so large a proportion of fatal cases, shows, as there has been occasion to remark in previous years, that personal carelessness contributes to fatal accidents no less than the want of precaution by the companies.

The next class in importance is that of persons using level crossings, of whom 48 were killed and 22 were injured. As in the case of passengers, these accidents would be lessened by the construction of footbridges over, or passages under, the railways. In the miscellaneous class, composed mostly of persons coming to the railways on business, but not being passengers or in the service of the companies, 38 were killed and 83 injured.

The large number of persons reported during each year as having been killed and injured whilst trespassing upon railways, makes it a matter for serious consideration whether all is done that can be devised to prevent so great a loss of life; whether the fences and gates are properly maintained; whether the rules are sufficiently stringent and are firmly acted upon whenever any person, for any reason whatever, is found wrongfully on the line.

GENERAL REMARKS.

Increased Safety to Passengers consequent upon Improvements in Railway Working.

If the increased safety of railway travelling may be judged of by the number of accidents to railway trains, rolling stock, permanent way, and by the number of passengers killed, the accidents in the past year of 1878 will contrast most favourably with those of the eight preceding years, especially when it is taken into consideration that both the number of trains of all descriptions and the number of passengers have largely increased. Amongst the causes which have led to this greater freedom from accidents, may no doubt be mentioned the more general interlocking and concentration of signal and point levers, the working of railways upon the absolute block telegraph system, and the exercise of the powers conferred upon the Board of Trade by the Regulation of Railways Act, 1871, which require all new railway works, such as stations, junctions, siding connections, cross-over roads, and additional lines of rails to be submitted for inspection before being brought into use, the proper arrangements of these works, including the interlocking and signal arrangements, being closely bound up with the working of the block system. It may be here stated that since the passing of that Act the railway companies, or the greater number of them, have been by no means negligent in enlarging and re-arranging their station yards, improving their stations, providing additional lines for their merchandize and general traffic, and in doubling their single lines. On these new works being submitted for inspection, care has been taken to eliminate, as far as possible, all elements of danger; unnecessary facing-points have been disallowed, and others have been required to be provided with proper facing-point-locks and locking-bars, and other requirements which were considered necessary for the safety of the public travelling on railways have been insisted upon. A reference to the tables in the Appendix, No. 4, attached to this report, will show that the length of railway opened for traffic has increased between December 1873 and December 1878 by nearly 1,300 miles, or 7·9 per cent.; that the number of

miles travelled by trains of all descriptions in each year, from and including 1873 to the end of 1878, has increased from 197 millions to rather more than 222 millions, or 12·7 per cent.; that the number of passengers carried, exclusive of season ticket holders, has increased from 455 millions in 1873 to nearly 565 millions in 1878, or 24 per cent.; and the number of tons of merchandise and minerals carried have during the same years increased from nearly 191 millions to nearly 207 millions, or 8·3 per cent.; yet, notwithstanding this increase in the length of railway brought into use in this period, the very great increase in the mileage of trains, and in the number of passengers and the number of tons of minerals and merchandise carried, the accidents arising in the working of railways shows a remarkable decrease in the past year as compared with the year 1873 and each of the succeeding years, the number of such accidents having decreased from 459 to 363. If the number of collisions included in those accidents alone are considered, they will also show during the year 1878 a still greater improvement, the number having decreased from 253 to 179, whilst the proportion to the whole number of those accidents show separately a gradual but very satisfactory decrease of from 55 per cent. in 1873, to 53 per cent. in 1874, to 49 per cent. in 1875, to 45 per cent. in 1876, to 46 per cent. in 1877, and to 49 per cent. in 1878.

Absolute Block and Interlocking Systems.

A reference to the tables in the Appendix will show that the comparative reduction in the number of accidents to trains during the past year has been concurrent with the introduction and extension of the absolute telegraph block system. At the end of the year 1873, a proportion of 6,217 miles, out of 16,082 miles open, was worked on that system, since which time the proportion has been extended to 10,287 miles out of 17,359 miles open at the end of 1878. The 10,287 miles so worked consisted of 7,078 miles, or more than three-fourths of the entire length of double line of railway open, and 3,209 miles or nearly the half of the entire length of single line of railway open. In other words, the increased number of miles worked on the absolute block system, which amounted to nearly 38 per cent. of the entire length of railway open at December 1873, amounted to 59 per cent. of the entire length of railway open at December 1878. Thus a very large proportion of the main lines and branch lines of railway in England and Scotland are now worked on the absolute block system.

By a further reference to the returns presented to Parliament, from which more detailed information may be obtained, it will be seen that 77 per cent. of the length of double lines of way, or an increase during the year of 3 per cent., is now worked on the absolute block system, and that the number of signal and point levers interlocked amount to 71 per cent.

It may also be observed from those returns, that of the important railway companies in England, the Manchester, Sheffield, and Lincolnshire ranks the lowest in the length of double line worked on the absolute block system, 45 per cent. being only so worked; that in Scotland, the North British has only 31 per cent., and the Glasgow and South-Western, 33 per cent.; and that in Ireland, the amount of line so worked is altogether insignificant, being only 14 per cent. of the 522 miles of double line.

With regard to the interlocking system, the important companies in England who rank the lowest in this respect, are the Great Eastern and the South Eastern; in Scotland, the Great North of Scotland has only 12 per cent., the Highland 28 per cent., and the North British 36 per cent.; and in Ireland, the Waterford and Limerick has only 14 per cent., the Great Northern of Ireland 16 per cent., and the Great Southern and Western 18 per cent.

There appears no reasonable excuse for the slow progress in the adoption of those systems, so necessary for the safe working of the railways belonging to those companies, and great responsibility will rest upon them should any serious accidents occur which could have been prevented by these means. In Ireland it is most desirable that the companies should no longer postpone the adoption of these safeguards. In several reports of inquiries into accidents on Irish railways it has been stated that had those systems been in force the accidents could not have occurred.

It is, however, satisfactory to observe with regard especially to the railways, in England, with the exception of the instances mentioned above, that the companies have been making in the past and previous years great exertions in re-organizing their lines and signal arrangements, and introducing the interlocking system, and have thus been able to do

much to perfect the absolute electric block working on their railways. It is to be hoped that the companies will not relax their efforts until the whole of their interlocking has been completed, and that when completed due precautions will be taken for the proper maintenance and working of the system. It is also to be hoped that no great length of time will be allowed to elapse before all their lines, including the junctions, which are in some cases worked in an improper manner, will be worked on the absolute block system; and further that the companies will see the necessity of working their single lines on the train staff and block systems; and of changing the mode of working of those lines now worked by the aid of the electric telegraph only.

Another precaution to be observed in connection with the interlocking system is, that all facing points should be secured during the passage over them of a train by efficient facing point locks and locking bars, or by some other effectual means which will effectually prevent the points from being pulled over by the signalman until the train has passed. A serious accident occurred from the neglect of this precaution during the past year at Chester, in which after five of the carriages of a train had passed, the remaining carriages were turned into and took another direction, and were consequently upset, 2 passengers being killed and 15 injured. It is a matter for regret that the managers of railway companies after the accidents which have occurred from this cause, should allow facing-points to exist upon any passenger line without this necessary precaution.

But the most serious collisions during the year,—the one on the Taff Vale Railway near Pontypridd, in which 13 passengers were killed and 93 injured, although primarily due to a mistake of a signalman, really resulted from the working of traffic on a wrong line of railway, not provided with out-of-door signals to check any mistake which a signalman might make. Another—a collision on the London, Chatham, and Dover Railway at Sittingbourne, in which 5 persons were killed and about 80 injured, was caused by the neglect of the head guard and a mistake of a porter in moving the wrong lever, and thereby turning some goods waggons across the main line on which a cheap fast up train was advancing at a speed of upwards of 40 miles an hour; this mistake could not have been made had the signals and point levers been properly interlocked.

In two other collisions—one, in which 39 passengers were injured in a train which was standing at Paisley station, and which was run into by a following train, was due to the want of the absolute block system of working; and the other, in which 46 passengers were injured at Drumburgh on the North British Railway, in a collision between two excursion trains, was owing to the want of a proper system of interlocking. In another case 38 passengers in a passenger train at Beccles station on the Great Eastern Railway were injured by a collision with a runaway sand train, which might have been turned into a siding had the points and signals at the station been concentrated in a cabin.

Out of these six collisions, resulting in the death of 20 and injury to 311 passengers, five were due to the want of either the interlocking or block systems, and would not have occurred had those systems been in force.

In the reports of inquiry into certain collisions, the advisability of adopting recent improvements for preventing as far as possible the mistakes which arise between signalmen in working the absolute block system has been commented upon. In the case of a collision on the Metropolitan Railway at Baker Street station, in which 12 passengers were injured, it was suggested that if the points and signals had been combined with the electric working of the block system by either of the systems recently invented, the collision would have been prevented. In the report of a collision which occurred at the Shoreditch station on the North London Railway, in which six passengers and two of the companies servants were injured, it was suggested as deserving of consideration whether those improvements for electrical block working would not have prevented the mistakes which led to the collision.

In the report of an inquiry into a collision which occurred at Dalston junction on the North London Railway, by which 15 passengers were injured, a similar suggestion was made as to the desirability of adopting mechanical means, by electricity, for preventing similar mistakes in working the absolute block system.

Mixed Passenger and Goods Trains.

The practice on some railways of running trains composed partly of passenger carriages and partly of goods and other waggons, has also been made the subject of comment

in several of the reports of inquiry, and recommendations have been made that such a practice should be discontinued wherever practicable.

Propelling Trains on Inclines.

The objectionable and dangerous practice also employed on some railways of assisting trains up inclines by means of pilot engines in the rear instead of in front, has led to several accidents in the past year and should be discontinued.

Catch-points on Inclines.

Some accidents have occurred also during the past year, fortunately not resulting in very grave injury, from the want of catch-points at stations or sidings on inclines. In one case a part of a train ran back for more than three miles, and in another case a very considerable distance, and were only stopped by a change of gradient, but the result in each case might have been most disastrous if a train had been met on the line. Under these circumstances it is not too much to require the railway companies to see that all necessary catch-points are provided, not merely in reference to new lines or new works submitted for inspection, but also on all their railways on which passenger traffic is carried.

Continuous Footboards.

Six cases of fatal accidents to passengers attempting to get into or out of railway carriages whilst the trains were in motion were inquired into during the year, all of which appeared more or less to be due to their own imprudence or want of care. By a reference to the returns, however, it will be seen that no less than 61 passengers were killed and 459 injured from this cause alone. Taking into consideration that 565 millions travelled by trains during the year, and the recklessness or impatience of passengers too often seen in getting in or out of the carriages before the train has stopped or after it has got into motion, it cannot be a cause for surprise that so many are injured or meet with some mishap; but that persons falling under such circumstances should be liable to be dragged under the wheels of the carriages, seems to indicate that proper means of entering and leaving the carriages are not provided. It is to be hoped that the narrow iron step will be abolished, and that proper continuous footboards will be provided, so as to render it impossible for a passenger to be injured in this way.

Replies to a circular addressed to the railway companies have been received, in many instances giving an assurance of their intentions both with regard to the height of platform and the fitting of suitable footboards. Under these circumstances it is to be hoped that before a long time has elapsed, this class of accident may be reduced to a minimum.

Defective Permanent Way.

In 2 investigated accidents, one on the Cork and Macroom Railway, in which 3 passengers were killed and 50 were injured, and 2 servants of the company were killed, the cause was found to arise from the very defective permanent way, which was also the case at an accident on the Bishops Castle Railway. In both these cases the Board of Trade suggested to the companies the propriety of at once reducing the speed of their trains. The lines have since been put into a satisfactory condition, and the trains are now running as usual.

Level Crossings of Roads, &c.

Complaints have been and are continually being received from road authorities and other parties, not only on the score of inconvenience, but of danger, to persons travelling on the roads crossing railways on the level, especially on those lines on which the traffic has greatly increased, and on some of which more than a double line of way has been laid.

Complaints have also been received of the danger to passengers at stations where they may have to pass across the line from one platform to another.

It certainly appears only reasonable that this danger to passengers wherever there is

a large traffic and always where there is more than a double line of way, should be guarded against by the construction of foot-bridges or subways. Considerable progress has, however, been made in this respect.

With regard to level-crossings over turnpike or public carriage roads, footpaths, and even over occupation roads or any private ways across a railway, where there is a large traffic or where the importance of the traffic is such as to necessitate the laying down of additional lines of rails or sidings upon their railways beyond a double line, it would appear only reasonable that the companies should be required to build bridges for all such roads, except in cases in which the building of bridges would be impossible or inconvenient for public use. In some cases, however, it may be a question whether the road authorities should not contribute in some proportion to the expense.

Continuous Breaks.

In 26 cases of accidents inquired into, it was reported that had the trains been fitted with continuous breaks in the hands of the driver, the consequences might have been either altogether prevented, or their effects in some degree mitigated. The accidents to which these remarks apply, caused the death of 5 and injuries to 307 passengers and 22 servants of companies.

Returns under the Railway Returns (Continuous Breaks) Act, 1878, are required to be laid before Parliament every six months. These Returns will indicate what has been done in a matter so important for securing safety in railway travelling.

In the report on a collision to a limited mail train on the Great Northern of Ireland Railway, it was pointed out that it afforded a striking illustration of the value of an *automatic* continuous break. Had the train been fitted with a break of this description, the carriages, which had separated, would at once have been arrested and no collision would have resulted.

In the report on an accident to a passenger train on the Midland Great Western Railway, in consequence of the breaking of the tyre of a wheel of the tenth vehicle from the engine, it was remarked that had the train been fitted with continuous breaks under the control of the driver, the train might have been stopped without risk, as soon as the vehicle was perceived to be off the rails, and the perilous run of three miles which ensued would have been avoided.

In the report on an accident to the up boat express train on the London, Chatham, and Dover Railway, by the breaking of an axle of the tender, it was stated that the effect of the *automatic* action of the breaks, coupled with the retarding force exercised by some of the wheels being off the rails, was estimated to have reduced the speed from 40 or 45 to 25 miles an hour, when the leading van struck the abutment of a bridge, in running a distance of 215 yards from the spot where the wheels left the rails.

In the report on a collision on the Lancashire and Yorkshire Railway at Kirkgate station, Wakefield, it was stated that the accident furnished a strong argument in favour of the general adoption of automatic breaks.

In the report of a collision on the London and North-Western Railway at Springs Branch Junction, near Wigan, it was reported that had the driver possessed control over a continuous break applying to the engine and tender, as well as to all the vehicles composing the train, instead of to only four out of nine of those vehicles, the force of the collision might have been much reduced.

In the report of a collision at the Citadel Station at Carlisle, in which 61 passengers were injured, it was stated that had the driver been provided with an efficient continuous break, he would no doubt have been able to have stopped his train in time to have prevented the collision.

In the report of a collision on the North London Railway, at Broad Street, it was stated that it was probable if there had been continuous breaks throughout the whole length of the train, instead of two sections of continuous breaks at its extremities, placed under the control of the engine-driver, he would have been enabled to have prevented the collision from taking place.

In the report of the serious collision at Sittingbourne on the London, Chatham, and Dover Railway, by which 5 passengers were killed and about 80 injured, it was stated that if the cheap fast up express train to which the collision occurred had been fitted with continuous breaks, although the use of them would not have prevented the collision from taking place, the shock of the collision would without doubt have been greatly diminished.

Concluding Remarks.

It cannot be otherwise than satisfactory to observe the annual decrease in the number of railway accidents requiring investigation, and especially in the number of collisions between trains. The facts above stated appear to justify the conclusion that this decrease is mainly due to improved methods of working, which have been the result of experience, of inquiry, and of comparison, aided by the result of official investigations and by parliamentary discussion. Nor is it too much to expect that those further improvements in railway working, which are now the subject of similar discussion, will be adopted by the companies, and will lead to still further immunity from accident.

I have the honour to be,

Sir,

Your most obedient servant,

HENRY G. CALCRAFT.

APPENDIX No. 1.

LIST of the ACCIDENTS which have been reported upon by the Inspecting Officers of the Department during the year 1878.—Classified according to the Nature of each Accident, and the Causes to which it may be attributed.

NAME OF RAILWAY AND DESCRIPTION OF ACCIDENT.	SUFFERERS BY ACCIDENT.		CAUSES OF ACCIDENT.																Improper Interference by Persons not under the Control of the Company.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
			Attributable to the Rolling Stock or the Works.				Attributable to the Management.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
							Fracture or unloosening of Couplings.	Defective Maintenance of		Defective Construction of	Insufficient or defective Accommodation for the Requirements of the Traffic.	Insufficient Establishment, inexperienced Servants, or too long Hours of Duty.	Inadequate or unsuitable Break-Power.	Want of Communication between Guard and Engine-driver.	Defective Arrangements of Signals or Points, or Want of or defective Locking-Apparatus, or Want of Safety-Points, or Locking Bars or Bolts.	Want of Time-pieces.	Insufficient or inadequately enforced Regulations.	Defective System for securing Intervals between Trains, or Want of Telegraph-Communication, or of Block-Telegraph-System.		Negligence, Want of Care, or Mistake of Officers or Servants.	Excessive Speed, having regard to Engine, or Road, or other Circumstances.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	Killed.	Injured.	Machinery of Train.	Road or Works.	Machinery of Train.	Road or Works.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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NAME OF RAILWAY AND DESCRIPTION OF ACCIDENT.*		SUFFERERS BY ACCIDENT.				CAUSES OF ACCIDENT.													
						Attributable to the Rolling Stock or the Works.						Attributable to the Management.							
						Fracture or loosening of Couplings.		Defective Maintenance of		Defective Construction of									
Killed.	Injured.	Pas-sengers and others.	Servants of Company only.	Machinery of Train.	Road or Works.	Machinery of Train.	Road or Works.	Insufficient or defective Accommodation for the Requirements of the Traffic.	Insufficient Establishment, inexperienced Servants, or too long Hours of Duty.	Inadequate or unsuitable Break-Power.	Want of Communication between Guard and Engine-driver.	Defective Arrangements of Signals or Points, or Want of defective Locking-Apparatus, or Want of Safety-Points, or Locking Bars or Bolts.	Want of Time-pieces.	Insufficient or inadequately enforced Regulations.	Defective System for securing Intervals between Trains, or Want of Telegraph-Communication, or of Block-Telegraph-System.	Negligence, Want of Care, or Mistake of Officers or Servants.	Excessive Speed, having regard to Engine, or Road, or other Circumstances.	Foggy Weather.	Improper Interference by Persons not under the Control of the Company.

B.—Accidents from Boiler-Explosions, Failures of Axles, Wheels, or Tyres, or from other Defects in the Rolling Stock.

CARDIFFIAN: 10 April.—Fracture of couplings of pas-senger train near Wemyss Bay Junction 10 July.—A passenger train left the rails between Holytown and Whifflet by breaking of axle of tender 16 August.—A down mixed train came into collision with a portion of a goods train left on the line by the breaking of a draw-bar at Perth Station	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
DELU, WICKLOW, AND WEXFORD: 27th February.—Portion of a goods train ran back and came into collision with a passenger train near Glenageary Station	1	15	-	1	1	-	-	-	-	-	-	-	-	-	1	-	-	-
GREAT NORTHERN: 24 January.—The axle of coal waggon of a goods train broke near Hatfield Sta-tion, causing the train to separate and fall the down line in front of the Scotch express	-	6	-	4	-	-	1	-	-	-	-	-	-	-	1	-	-	-
GREAT NORTHERN OF IRELAND: 24 July.—Collision between Beragh and Omagh Stations between two parts of a mixed train, owing to the fracture of a draw-bar 17th August.—Collision between Skerries and Balbriggan, between a passenger train and the engine and tender from which it had separated, owing to the fracture of the coupling	-	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
GREAT NORTH OF SCOTLAND: 14 May.—A mixed train left the rails by breaking of an axle of a goods waggon in a mixed train at Mill of Craigston 15th September.—The boiler of an engine of a mixed train exploded at Nethy Bridge Station	-	8	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
GREAT WESTERN: 26th November.—Dome of engine of a pas-senger train blown off as the train was starting at Penzance Station	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
IRELAND: 27th November.—Portion of a mixed train left the rails near Blair Athole Station	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
LONDON AND NORTH-WESTERN: 16th November.—A passenger train left the rails a short distance north of Wigan by breaking of a pin of the connecting-rod of engine	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LONDON AND NORTH-WESTERN AND GREAT WESTERN: 25th July.—The last waggon of a ballast train left the rails near Leebotwood by breaking of an axle-box	-	-	-	8	-	1	-	-	-	-	-	-	-	-	1	-	-	-
LONDON AND SOUTH-WESTERN: 25th January.—The axle of the leading carriage of a passenger train broke near Kimbridge Junction 26th May.—Passenger train left the rails in Fareham Tunnel from the breaking of the crank-pin of the engine	-	2	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-
LONDON, CHATHAM, AND DOVER: 26th November.—Part of an express train left the rails near Bickley by fracture of under-axle near Bickley Station	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NAME OF RAILWAY AND DESCRIPTION OF ACCIDENT.	SUFFERERS BY ACCIDENT.		CAUSES OF ACCIDENT.															
			Attributable to the Rolling Stock or the Works.				Attributable to the Management.											
	Pas- sengers and others.	Servants of Company only.	Fracture or loosening of Couplings.	Defective Maintenance of Machinery of Train.	Road or Works.	Defective Construction of Machinery of Train.	Road or Works.	Insufficient or defective Accommodation for the Requirements of the Traffic.	Insufficient Establishment, inexperienced Servants, or too long Hours of Duty.	Inadequate or unsuitable Break-Power.	Want of Communication between Guard and Engine-Driver.	Defective Arrangements of Signals or Points, or Want of or defective Locking-Apparatus, or Want of Safety-Points, or Locking Bars or Bolts.	Want of Time-pieces.	Insufficient or inadequately enforced Regulations.	Defective System for securing Inter-vals between Trains, or Want of Telegraph-Communication, or Block-Telegraph-System.	Negligence, Want of Care, or Mistake of Officers or Servants.	Excessive Speed, having regard to Engine, or Road, or other Circumstances.	Foggy Weather.
	Killed.	Injured.	Killed.	Injured.														Improper Interference by Persons not under the Control of the Company.

B.—Accidents from Boiler-Explosions, Failures of Axles, Wheels, or Tyres, or from other Defects in the Rolling Stock—continued.

MIDLAND GREAT WESTERN OF IRELAND: 17th December.—Van at rear of passenger train left the rails near Blanchardstown Station by fracture of tyre	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	-
20th December.—Tyre of driving-wheel of engine of mail train broke near Donaghmore Station	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
NORTH-EASTERN: 24th November.—Explosion of boiler of engine of a goods train at Blaydon Station	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	1	41	-	21	5	4	1	6	-	-	-	-	2	-	-	-	6	-

C.—Accidents from Trains entering Stations at too great Speed.

CALEDONIAN: 23rd February.—Passenger train came into collision with buffer stops at Grange-mouth Station	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
27th June.—A passenger train ran into buffer stops at Buchanan Street Station, Glasgow	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
TOTAL	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-

D.—Collisions between Engines and Trains following one another on the same Line of Rails, excepting at Junctions, Stations, or Sidings.

GLASGOW CITY UNION: 9th May.—Collision between a passenger train and a preceding goods train stopped by the fracture of a draw-bar	-	4	-	-	1	-	-	-	-	-	-	-	-	1	1	1	-	-
METROPOLITAN: 3rd February.—Collision between two coal trains between Farringdon Street and Ludgate Hill Stations	-	-	-	2	-	-	-	-	-	-	-	-	1	-	1	-	-	-
19th October.—Collision between a passenger train and a detached part of a preceding goods train between Farringdon Street and King's Cross	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-
TOTAL	-	5	-	2	2	-	1	-	-	-	-	-	2	1	2	-	-	-

E.—Collisions at Junctions.

GREAT EASTERN: 7th February.—A passenger train came into collision with an engine and break-van at the Western Junction at Stratford	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
5th August.—Collision between two passenger trains at Stepney Junction	-	24	-	2	-	-	-	1	-	-	-	1	-	-	-	-	-	-
LONDON AND NORTH-WESTERN: 30th January.—A passenger train ran into the rear of a goods train standing outside the Platts Bridge Junction	-	4	-	-	-	-	-	-	1	-	-	-	1	-	1	-	1	-

continued.

NAME OF RAILWAY AND DESCRIPTION OF ACCIDENT.				SUFFERERS BY ACCIDENT.		CAUSES OF ACCIDENT.																					
Killed.		Injured.		Pas- sengers and others.		Servants of Company only.		Attributable to the Rolling Stock or the Works.				Attributable to the Management.															
								Fracture or unloosening of Couplings.				Defective Maintenance of		Defective Construc- tion of		Insufficient or defective Accommoda- tion for the Requirements of the Traffic.											
								Machinery of Train.				Road or Works.		Machinery of Train.		Road or Works.		Insufficient Establishment, Inexpe- rienced Servants, or too long Hours of Duty.									
																		Inadequate or unsuitable Break- Power.									
																		Want of Communication between Guard and Engine-driver.									
																		Defective Arrangements of Signals or Points, or Want of or defective Lock- ing-Apparatus, or Want of Safety- Points, or Locking Bars or Bolts.									
																		Want of Time-pieces.									
																		Insufficient or inadequately enforced Regulations.									
																		Defective System for securing Inter- vals between Trains, or Want of Telegraph-Communication, or of Block-Telegraph-System.									
																		Negligence, Want of Care, or Mis- take of Officers or Servants.									
																		Excessive Speed, having regard to Engine, or Road, or other Circumstances.									
																		Foggy Weather.									
																		Improper Interference by Persons not under the Control of the Company.									

E.—Collisions at Junctions—continued.

LONDON, BRIGHTON, AND SOUTH COAST: 24 August.—Collision at Bricklayers' Arms Junction between an excursion train and two light engines, and between one of the latter and another light engine	-	168	-	-	-	-	-	-	1	-	-	1	-	-	-	1	-	-	-	-
MIDLAND: 26th June.—Collision between a passenger train and a goods train at Settle Junc- tion	-	6	-	4	-	-	-	-	-	1	-	-	-	-	1	1	-	-	-	-
26th September.—Collision between an up Scotch express and a goods train at Whitehall Junction, Leeds	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-
SOUTH BRITISH: 3d January.—A special train came into collision with a goods train at Bonning- ton South Junction	-	6	-	-	-	-	-	-	-	1	-	-	-	-	1	1	-	-	-	-
SOUTH-EASTERN: 1st May.—Collision between an up and a down passenger train at Charlton Station	-	-	-	-	-	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-
TAFF VALE: 19th October.—Collision between a train of empty carriages and a passenger train at Rhonda Branch Junction, near Ponty- pridd	13	93	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-
TOTAL	13	318	-	6	-	1	-	2	2	-	2	3	-	2	2	8	-	-	12	-

F.—Collisions within fixed Signals at Stations or Sidings.

BELFAST AND COUNTY DOWN: 25th October.—Collision between two trains at Newtownards	-	2	-	1	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-
CALEDONIAN: 24th July.—Collision between passenger train and light engine at Larbert Station	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
24th July.—Collision between engine and the train to which it was about to be attached	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
14th December.—Collision between a pas- senger train and limited mail train, near Wemyss Bay Junction	-	13	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-
CHADWEL (CARLISLE) STATION LINES: 2nd July.—Collision between two passenger trains	-	61	-	2	-	-	-	-	-	1	-	-	-	1	1	1	-	-	-	-
GLASGOW AND PAISLEY JOINT: 13th July.—Passenger train came into col- lision with a portion of a train standing at Paisley Station	-	39	-	-	-	-	-	-	1	1	-	-	-	1	1	1	1	-	-	-
GLASGOW AND SOUTH-WESTERN: 12th November.—Collision between an express train and a mineral train at Barassie Junction	-	4	-	2	-	-	-	-	-	1	-	-	-	-	1	1	-	-	-	-
GREAT NORTHERN OF IRELAND: 11th October.—Collision between an express train and a train of empty wagons at Navan Station	-	-	-	2	-	-	-	1	-	-	-	-	-	-	1	1	-	-	-	-
GREAT WESTERN: 17th January.—Some goods wagons of a mixed train which were being pushed back at Theale Station became uncoupled from the engine and came into collision with the passenger carriages to which they were to be attached	-	5	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
11th October.—Collision between a passen- ger train and an empty train at Dudley Station	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
12th December.—Double collision between an up passenger train and a goods train and between a down passenger train and part of the goods train at Slough Station	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	1	1	1	-	-

NAME OF RAILWAY AND DESCRIPTION OF ACCIDENT.	SUFFERERS BY ACCIDENT.		CAUSES OF ACCIDENT.												
			Attributable to the Rolling Stock or the Works.				Attributable to the Management.								
	Pas- sengers and others.	Servants of Company only.	Fracture or unloosening of Couplings.		Defective Main-tenance of		Defective Construc- tion of		Insufficient or defective Accommoda- tion for the Requirements of the Traffic.	Insufficient Establishment, inexpe- rienced Servants, or too long Hours of Duty.	Inadequate or unsuitable Break- Power.	Want of Communication between Guard and Engine-driver.	Defective Arrangements of Signals or Points, or Want of defective Lock- ing-Apparatus, or Want of Safety- Points, or Locking Bars or Bolts.	Want of Time-pieces.	Insufficient or inadequately enforced Regulations.
			Killed.	Injured.	Machinery of Train.	Road or Works.	Machinery of Train.	Road or Works.							

F.—Collisions within fixed Signals at Stations or Sidings—continued.

LANCASHIRE AND YORKSHIRE:

6th March.—A passenger train came into collision with some loaded waggons which were being shunted across the main line at River Bridge Sidings, near Sowerby Bridge

2nd September.—Collision between two passenger trains at Kirkgate Joint Station

3rd September.—Collision between passenger train and some empty carriages which had been let down out of a siding at Sowerby Bridge

LEEDS JOINT STATION:

20th November.—Collision between a passenger train and a train of empty coaches at this station

LONDON AND NORTH-WESTERN:

31st May.—Collision between passenger train and a coal train at Bolton Station

20th July.—Collision between a light engine and a passenger train at Edge Hill Station

23rd September.—A portion of a passenger train came into collision with an engine at Rugby Station

20th September.—Collision between express train and a train of empty coal waggons at Springs Branch Junction

15th November.—Collision between an express train and a loaded truck at Rugby

19th November.—Collision between a passenger train and a coal train between Ince Moss Junction and Springs Branch Junction

11th December.—Collision between two goods trains and between a truck of one of the goods trains and a passenger train near Widnes Station

16th December.—Collision between a passenger train and a light engine at a through crossing near Tyldesley Station

LONDON AND NORTH-WESTERN AND GREAT WESTERN JOINT:

11th November.—Collision between two passenger trains near Shrewsbury

LONDON, BRIGHTON, AND SOUTH COAST:

2nd November.—Collision between two passenger trains at York Road Station

LONDON, CHATHAM, AND DOVER:

31st August.—Collision between a passenger train and some goods waggons wrongly turned across the up line at Sittingbourne Station

MANCHESTER, SHEFFIELD, AND LINCOLNSHIRE:

20th November.—Collision between a passenger train and a goods train inside the distant-signal at Mexborough Station

METROPOLITAN:

19th March.—Collision between two down passenger trains at the Baker Street Station

METROPOLITAN DISTRICT:

21st January.—Collision between an up and a down passenger train at the entrance of the Mansion House Station

MIDLAND:

17th January.—An express passenger train came into collision with a wagon which had been pushed out of a siding foul of the down line at Loughborough Station

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F.—Collisions within fixed Signals at Stations or Sidings—continued.

MIDLAND—continued. 24th February.—A passenger train came into collision with some coal trucks which had fouled the main line at Coates Park Sidings 25th December.—Collision between an express train and a goods break-van attached to an engine at Methley Junction	-	13	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-
	-	3	1	4	-	-	-	-	-	-	-	1	-	-	-	1	-	1	-	1	-
NORTH BRITISH : 2nd July.—Collision between two excursion trains at Drumburgh Station	-	46	-	-	-	-	-	-	-	-	-	1	-	1	-	-	1	1	1	-	-
	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-
NORTH-EASTERN : 30th July.—Collision between two goods trains at York Station	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NORTH LONDON : 13th January.—A down passenger train came into collision with a down passenger train standing at the Shoreditch Station 7th June.—An up passenger train came into collision with an up empty train at Dalston Junction Station	-	6	-	2	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-
	-	15	-	1	-	-	-	-	-	-	-	-	-	1	-	1	1	1	1	-	-
BREITSEY : 8th February.—A pilot engine came into collision with the engine of a goods train between Crockerstown and Goal Lane Sidings	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	1	-	-
SOUTH-EASTERN : 3rd September.—Collision between a passenger train and a train of empty carriages at Waterloo Junction	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	1	-	-
	5	395	3	27	1	1	-	-	1	3	1	18	-	9	-	6	10	36	7	6	-
TOTAL -	5	395	3	27	1	1	-	-	1	3	1	18	-	9	-	6	10	36	7	6	-

G.—Collisions between Engines or Trains meeting in opposite Directions.

DUBLIN, WICKLOW, AND WEXFORD : 7th September.—Collision between a mineral train and a ballast train at Dalkey Station	-	-	-	1	-	-	1	-	-	-	-	-	-	1	-	-	1	1	-	-	-
	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-
GREAT WESTERN : 11th November.—Collision between two passenger trains at Molland and Bishop's Nympton Station	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-
	-	-	1	1	-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	-
NORTH BRITISH : 11th October.—Collision between a special goods train and a ballast train between Grange and Bog Side Stations	-	-	1	1	-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	-
	-	1	1	2	-	-	1	-	-	-	-	1	-	2	-	-	2	3	-	-	-
TOTAL	-	1	1	2	-	-	1	-	-	-	-	1	-	2	-	-	2	3	-	-	-

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Killed.		Injured.		Pas- sengers and others.		Servants of Company only.		Attributable to the Rolling Stock or the Works.				Attributable to the Management.																									
Killed.		Injured.						Fracture or unloosening of Couplings.		Defective Maintenance of		Defective Construc- tion of		Insufficient or defective Accommoda- tion for the Requirements of the Traffic.		Insufficient Establishment, insep- rienced Servants, or too long Hours of Duty.		Inadequate or unsuitable Break- Power.		Want of Communication between Guard and Engine-driver.		Defective Arrangements of Signals or Points, or Want of or defective Lock- ing-Apparatus, or Want of Safety- Points, or Locking Bars or Bolts.		Want of Time-pieces.		Insufficient or inadequately enforced Regulations.		Defective System for securing Inter- vals between Trains, or Want of Telegraph-Communication, or of Block-Telegraph-System.		Negligence, Want of Care, or Mis- take of Officers or Servants.		Excessive Speed, having regard to Engine, or Road, or other Circumstances.		Foggy Weather.		Improper Interference by Persons not under the Control of the Company.	
Killed.		Injured.						Machinery of Train.		Road or Works.		Machinery of Train.																									

H.—Accidents in consequence of Engines or Trains being wrongly turned into Sidings or otherwise through Facing-points.

BELFAST AND NORTHERN COUNTIES: 8th March.—A passenger train in the rails at Bank Sidings, near Larne	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-
DUBLIN, WICKLOW, AND WEXFORD: 19th April.—Passenger train wrongly turned into Bray Head Stone Sidings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
GREAT WESTERN: 30th August.—Collision at Princes Risborough between a passenger train and some waggons in a siding	-	7	-	2	-	-	1	-	-	-	-	-	1	-	-	-	1	-	-	-
HIGHLAND: 22nd November.—Part of a passenger train left the rails at a passing loop at Lantran	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	1	-	-	-
LANCASHIRE AND YORKSHIRE: 10th January.—A pick-up goods train ran violently into safety points at Mirfield Station	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-
LONDON AND NORTH-WESTERN AND GREAT WESTERN: 8th July.—Three carriages of a passenger train left the rails at Chester Central Station	2	16	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-
LONDON AND SOUTH-WESTERN: 5th July.—Passenger train came into collision with some ballast trucks in a siding	-	4	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-
MANCHESTER, SHEFFIELD, AND LINCOLNSHIRE: 9th November.—A passenger train came into collision with a light-engine at facing points of a goods line junction at Ardwick	-	10	-	4	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-
METROPOLITAN AND ST. JOHN'S WOOD: 25th October.—Collision between two passenger trains at St. John's Wood Road Station	-	5	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-
NORTH LONDON: 12th November.—A passenger train turned by mistake into a bay and came into collision with a train of empty carriages at Broad Street Station	-	17	-	1	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-
SOUTH EASTERN: 5th November.—Part of a passenger train left the rails at facing points at Cannon Street Station	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-
TOTAL	2	55	1	8	-	-	1	-	-	1	3	-	6	-	-	-	11	1	-	-

I.—Accidents on Inclines.

BELFAST AND NORTHERN COUNTIES: 23rd December.—Four passenger carriages escaped from siding near Carrickfergus Station	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
BRECON AND MERTHYR JUNCTION: 2nd December.—A mixed mineral train became unmanageable between Torpantau and Talybont Stations	-	-	4	4	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-

continued.

NAME OF RAILWAY AND DESCRIPTION OF ACCIDENT.				SUFFERERS BY ACCIDENT.		CAUSES OF ACCIDENT.															
Passengers and others.		Servants of Company only.		Attributable to the Rolling Stock or the Works.		Attributable to the Management.															
Killed.	Injured.	Killed.	Injured.	Fracture or unloosening of Couplings.		Defective Maintenance of		Defective Construction of		Insufficient or defective Accommodation for the Requirements of the Traffic.											
				Machinery of Train.	Road or Works.	Machinery of Train.	Road or Works.	Insufficient Establishment, inexperienced Servants, or too long Hours of Duty.	Inadequate or unsuitable Break-Power.	Want of Communication between Guard and Engine-driver.	Defective Arrangements of Signals or Points, or Want of or defective Locking-Apparatus, or Want of Safety-Points or Locking Bars or Bolts.	Want of Time-pieces.	Insufficient or inadequately enforced Regulations.	Defective System for securing Intervals between Trains, or Want of Telegraph-Communication, or of Block-Telegraph-System.	Negligence, Want of Care, or Mistake of Officers or Servants.	Excessive Speed, having regard to Engine, or Road, or other Circumstances.	Foggy Weather.	Improper Interference by Persons not under the Control of the Company.			

J.—Accidents on inclines—continued.

LANCASHIRE AND YORKSHIRE :																		
17th May.—Collision between a pilot engine and passenger train on incline, near Wemyss Bay Junction	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
24th July.—Part of a passenger train ran back on the incline near Lift Station	-	1	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-
GLoucestershire and SOUTH-WESTERN :																		
23rd July.—Collision between some run- way trucks and an excursion train standing at Beccles Junction Station	-	38	-	-	-	-	-	-	1	-	1	-	-	-	1	-	-	-
GLoucestershire and SOUTH-WESTERN :																		
7th May.—Passenger train got off rails on incline at Bickleigh Station	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-
8th January.—Collision between Kings- bridge Road and Brent Stations between a passenger train and a runaway portion of a goods train	-	4	-	3	1	-	-	1	-	-	-	-	-	-	1	-	-	-
26th November.—Collision between two parts of a goods train that had become separated near Horrabridge Station	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
LANCASHIRE AND YORKSHIRE :																		
2nd September.—Collision between a pas- senger train and a following bank engine near Middleton Junction	-	3	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
GLoucestershire and SOUTH-WESTERN :																		
31st August.—Collision between engine and vehicles of a train which had been detached and followed the engine down the incline at Holyhead	-	12	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
GLoucestershire and SOUTH-WESTERN :																		
8th January.—A Great Northern train ran back and fouled the junction at Kings Cross and was run into by a Midland train	-	3	-	1	-	-	-	-	-	-	1	-	-	-	1	-	-	-
TOTAL	-	71	5	8	3	-	-	1	1	-	2	-	1	-	7	1	-	-

M.—Miscellaneous.

GLoucestershire and SOUTH-WESTERN :																		
3th May.—A passenger stepping out of train at Bishopsgate Street Station after train had started	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
GLoucestershire and SOUTH-WESTERN :																		
2th August.—A person crossing at Marsh Gate level-crossing run over	1	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-
GLoucestershire and SOUTH-WESTERN :																		
2th April.—A passenger attempting to enter a train in motion at Turnham Green Station	1	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
2nd May.—A passenger, Sir Francis Gold- smith, fell in alighting between the car- riages and the platform	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22nd June.—A guard of a passenger train killed by his head coming in contact with some scaffolding of a foot-bridge	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
GLoucestershire and SOUTH-WESTERN :																		
12th March.—The prompt application of the Westinghouse brake prevented a col- lision between two up passenger trains which otherwise must have occurred	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
23rd August.—Passenger train became separated by the guard applying the rear break too soon at Gloucester Road Station	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-

NAME OF RAILWAY AND DESCRIPTION OF ACCIDENT.	SUFFERERS BY ACCIDENT.				CAUSES OF ACCIDENT.																	
					Attributable to the Rolling Stock or the Works.				Attributable to the Management.													
	Killed.	Injured.	Killed.	Injured.	Fracture or unloosening of Couplings.	Defective Main-tenance of		Defective Construc-tion of		Insufficient or defective Accommoda-tion for the Requirements of the Traffic.	Insufficient Establishment, inexpe-rienced Servants, or too long Hours of Duty.	Inadequate or unsuitable Break-Power.	Want of Communication between Guard and Engine-Driver.	Defective Arrangements of Signals or Points, or Want of or defective Lock-ing-Apparatus, or Want of Safety-Points, or Locking Bars or Bolts.	Want of Time-pieces.	Insufficient or inadequately enforced Regulations.	Defective System for securing Inter-vals between Trains, or Want of Telegraph-Communication, or of Block-Telegraph-System.	Negligence, Want of Care, or Mistake of Officers or Servants.	Excessive Speed, having regard to Engine, or Road, or other Circumstances.	Foggy Weather.	Improper Interference by Persons not under the Control of the Company.	
						Machinery of Train.	Road or Works.	Machinery of Train.	Road or Works.													

M.—Miscellaneous—continued.

NORTH LONDON: 21st August.—Passenger fell between the platform and the train in alighting at Haggerstone Station	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
SOUTH-EASTERN: 22nd May.—A travelling courier putting his head out of the window of a second-class carriage was injured by coming in contact with the walls of Shakespeare Tunnel	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
4th July.—A female passenger fell between the platform and the train in alighting	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	6	1	1	-	-	-	-	2	2	-	-	1	-	1	-	-	-	4	-	-	-

APPENDIX No. 2.

ABSTRACT of the ACCIDENTS which have been reported upon by the Inspecting Officers of the Department during the year 1878.—Classified according to the Class of each Accident, and the Causes to which it may be attributed.

CLASS OF ACCIDENT AND NAME OF RAILWAY.	Number of Accidents.	SUFFERERS BY ACCIDENT.				CAUSES OF ACCIDENT.														
						Attributable to the Rolling Stock or the Works.					Attributable to the Management.									
		Fracture or unloosening of Couplings.	Defective Maintenance of Machinery of Train.	Road or Works.	Defective Construction of Machinery of Train.	Road or Works.	Insufficient or defective Accommodation for the Requirements of the Traffic.	Insufficient Establishment, inexperienced or aged Servants, or too long Hours of Duty.	Inadequate or unsuitable Break Power.	Want of Communication between Guard and Engine-driver.	Defective Arrangements of Signals or Points, or Want of defective Locking Apparatus, or Want of Safety Points, or Locking Bars or Bolts.	Want of Time-pieces.	Insufficient or inadequately enforced Regulations.	Defective System for securing Intervals between Trains, or Want of Telegraph Communication, or of Block Telegraph System.	Negligence, Want of Care, or Mistake of Officers or Servants.	Excessive Speed, having regard to Engine, or Road, or other Circumstances.	Foggy Weather, or Snow.	Improper Interference by Persons not under the Control of the Company.		
																			Passengers and others.	Servants of Company.
Killed.	Injured.	Killed.	Injured.																	
CLASS OF ACCIDENT.																				
A.—Accidents from Engines or Vehicles meeting with or leaving the Rails in consequence of Obstructions or of Defects in connexion with the Permanent-way or Works	12	3	83	3	5	-	-	8	-	3	-	-	-	1	-	-	2	2		
B.—Accidents from Boiler-explosions, or from Failures of Axles, Wheels, or Tyres, or from other defects in rolling-stock	19	1	41	-	21	5	4	1	6	-	-	-	2	-	-	-	6	-		
C.—Accidents from Trains entering Stations at too great Speed	2	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2		
D.—Collisions between Engines and Trains following one another on the same Line of Rails, excepting at Junctions, Stations, or Sidings	3	-	5	-	2	2	-	-	1	-	-	-	-	-	-	-	2	-		
E.—Collisions at Junctions	9	13	318	-	6	-	1	-	-	2	2	-	2	-	-	12	2	-		
F.—Collisions, within fixed Signals, at Stations or Sidings	38	5	395	3	27	1	1	-	-	1	3	1	18	9	-	6	10	38		
G.—Collisions between Engines or Trains meeting in opposite Directions	3	-	1	1	2	-	-	1	-	-	-	-	1	-	-	2	3	-		
H.—Accidents or collisions on level-crossings of railways	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
I.—Accidents in consequence of Engines or Trains being wrongly turned into Sidings or otherwise through Facing-Points	11	2	55	1	8	-	-	1	-	-	-	1	3	-	-	-	11	1		
J.—Accidents on Inclines	11	-	71	5	8	3	-	-	-	1	-	-	2	-	-	1	-	-		
K.—Miscellaneous	10	7	1	1	-	-	-	-	2	2	-	-	1	-	-	-	4	-		
TOTAL	118	31*	984	14	79	11	6	11	9	9	6	2	29	-	26	-	11	15		
NAME OF RAILWAY.																				
Length of Railway.																				
Miles.																				
Belfast and County Down	55	2	-	2	-	-	-	1	-	-	-	-	-	-	-	-	2	1		
Belfast and Northern Counties	151	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Bishop's Castle	10	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-		
Brecon and Merthyr	62	2	-	-	4	4	-	1	-	1	-	-	-	1	-	-	1	-		
Caledonian	847	12	-	47	-	1	3	1	1	1	-	-	1	1	-	-	7	2		
Carnegie Station, Carlisle	-	1	-	61	-	2	-	-	-	-	-	-	-	-	-	-	1	-		
Cork and Macroom	24	1	3	50	2	-	-	1	-	-	-	-	-	-	-	-	-	-		
Dublin, Wicklow, and Wexford	135	3	1	15	-	2	1	1	-	-	-	-	-	1	-	-	1	3		
Glasgow, Wicklow, and Wexford	+	1	-	39	-	-	-	-	-	-	-	1	1	1	-	-	1	1		
Glasgow and Paisley Joint	325	1	-	4	-	2	-	-	-	-	-	-	-	-	-	-	1	1		
Glasgow and South-Western	6	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	1		
Glasgow City Union	877	5	1	82	-	2	-	1	1	1	-	-	1	2	-	-	2	2		
Great Eastern	693	3	1	25	-	8	-	-	1	1	-	-	1	-	-	-	2	1		
Great Northern	459	3	-	7	-	2	2	-	-	-	-	-	1	-	-	-	2	-		
Great Northern of Ireland	286	2	-	8	-	1	-	-	2	-	-	-	-	-	-	-	-	-		
Great North of Scotland	2,139	11	-	33	1	5	3	1	2	1	-	1	2	1	-	1	5	2		
Great Western	402	2	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-		
Highland	455	5	-	10	1	2	-	-	-	-	-	1	2	-	-	-	5	1		
Leamshire and Yorkshire	+	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-		
Leeds Joint Station	1,676	12	-	69	-	8	-	-	-	-	2	-	4	-	-	2	1	2		
London and North-Western	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
London and North-Western and Great Western Joint	+	3	2	15	-	9	-	1	-	-	-	-	-	1	-	-	3	-		
London and South-Western	698	6	2	6	1	-	-	1	-	1	2	-	1	-	-	-	2	-		
London, Brighton, and South Coast	349	2	-	186	-	-	-	-	-	-	-	1	-	-	-	-	-	-		
London, Chatham, and Dover	159	2	5	82	-	1	-	-	-	-	-	-	1	-	-	-	1	-		
Manchester, Sheffield, and Lincolnshire	262	3	-	12	1	5	-	-	-	-	-	-	2	-	-	-	2	1		
Metropolitan	14	5	-	21	-	3	1	-	-	1	-	-	1	-	-	-	4	-		
Metropolitan District	9	3	-	1	-	-	-	-	-	-	-	-	2	-	-	-	2	-		
Midland	1,295	5	-	22	1	8	-	1	-	-	-	-	2	-	-	1	5	-		
Midland Great Western	425	2	-	-	-	1	-	-	1	2	-	-	-	-	-	-	-	-		
North British	913	3	-	52	1	1	-	-	-	-	-	-	2	-	-	3	3	1		
North-Eastern	1,453	2	-	-	1	4	-	-	-	-	-	-	-	-	-	-	1	1		
North London	12	4	1	38	-	4	-	-	-	-	-	-	1	-	-	2	4	1		
Rhymney	42	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	1	-		
South-Eastern	334	5	2	-	-	-	-	1	-	-	-	-	1	-	-	1	3	1		
Taff Vale	86	1	13	93	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TOTAL	14,653	118	31	984	14	79	11	6	11	9	9	6	2	29	-	26	-	11		

* Six were not caused by train accidents.

† The length of each of these railways is included in the mileage of the company or companies to whom it belongs.

TABLE showing NUMBER of MILES open for TRAFFIC; NUMBER of PASSENGERS conveyed; NUMBER of MILES travelled by PASSENGER TRAINS, GOODS TRAINS, and MIXED TRAINS; together with the NUMBER of ACCIDENTS to TRAINS, ROLLING STOCK, PERMANENT WAY, &c., and the NUMBER of PERSONS KILLED and INJURED thereby, on the RAILWAYS in the UNITED KINGDOM during the Years 1872 to 1878, both inclusive.

Number of miles open for traffic, number of passengers conveyed, and number of miles travelled by trains.					Accidents to passenger trains.					Accidents to goods trains.					Other accidents and casualties to trains, rolling stock, permanent way, &c.														Number of persons killed and injured.														
Number of miles open for traffic.		Number of passengers conveyed, exclusive of season tickets.	Number of season or periodical ticket holders.	Number of miles travelled by passenger trains.	Number of miles travelled by goods trains.	Number of miles travelled by mixed trains.	Collisions between passenger trains or parts of passenger trains.	Collisions between goods trains or parts of goods trains.	Trains coming in contact with projections from other trains travelling on parallel lines.	Trains leaving the rails.	Trains or engines travelling in the wrong direction through points.	Trains running at too high a speed.	TOTAL.	Collisions between goods trains or parts of goods trains.	Goods trains or parts of goods trains, engines, &c. leaving the rails.	TOTAL.	Trains running over cattle or other obstructions on the line.	Trains running through gates at level-crossings.	The bursting of boilers or tubes, &c. of engines.	The failure of machinery, springs, &c. of engines.	The failure of tyres.	The failure of wheels.	The failure of axles.	The failure of break apparatus.	The failure of couplings.	The failure of ropes used in working inclines.	The failure of tunnels, bridges, viaducts, or culverts.	Broken rails.	The flooding of portions of permanent way.	Slips in cuttings or embankments.	Fire in trains.	Fire at stations, or involving injury to bridges or viaducts.	Other accidents.	Killed.	Injured.	Num-ber of pas-sengers and others.	TOTAL all ser-vants, classes.						
ENGLAND AND WALES 1872					372,460,223	217,838	77,283,043	78,899,570	1,099,143	47	132	—	75	29	12	295	30	21	51	99	25	2	13	51	11	77	—	9	3	3	124	5	24	6	1	8	9	1,074	33	174	42	1,246	
1873					401,465,086	257,470	78,724,510	82,592,176	1,244,618	46	110	—	58	36	16	296	35	22	57	84	19	5	8	28	4	82	1	2	—	—	—	97	—	7	4	3	3	35	1,270	23	194	58	1,464
1874					423,063,941	438,523	81,408,225	83,752,086	986,620	45	153	—	84	34	20	339	63	131	106	50	6	6	40	9	171	1	21	3	3	345	4	5	8	9	10	62	1,419	36	232	98	1,651		
1875					451,032,641	508,854	85,513,064	87,881,918	1,136,975	53	160	—	73	64	26	376	76	68	122	250	71	16	10	619	110	374	6	18	7	1	846	83	16	6	34	14	1,097	14	213	28	1,310		
1876					480,869,391	545,056	89,532,620	89,275,438	1,338,765	52	169	—	99	23	20	393	33	39	92	170	67	11	9	845	73	313	4	20	1	5	332	10	11	9	13	36	1,049	22	190	58	1,359		
1877					492,404,036	581,650	92,515,685	90,130,545	653,089	43	98	—	65	15	22	288	19	18	37	151	47	4	5	865	38	437	2	9	3	6	283	25	15	3	14	11	611	20	130	31	741		
1878					508,962,993	570,111	95,174,571	89,196,968	809,403	44	77	—	50	12	13	196	20	11	31	146	53	7	1	957	17	460	—	6	—	2	300	17	19	3	4	20	927	12	115	32	1,042		
SCOTLAND					34,097,183	35,283	10,061,219	13,125,281	1,083,427	6	27	—	10	6	1	50	3	5	8	12	5	4	2	9	—	68	—	2	—	—	90	2	4	14	—	2	10	150	7	33	17	183	
1873					37,512,796	37,707	10,276,613	13,932,817	1,100,652	4	40	—	14	4	4	66	9	5	14	18	4	—	1	2	1	46	—	1	—	—	106	2	3	20	2	1	3	211	7	30	10	241	
1874					38,220,892	36,796	9,897,601	13,793,987	1,244,551	5	30	—	10	4	—	49	11	8	10	26	2	—	1	—	44	—	1	—	—	148	6	2	20	3	1	17	160	10	33	27	193		
1875					39,098,932	67,666	9,898,524	14,218,606	1,372,766	1	16	—	10	5	3	35	7	9	10	28	5	3	35	1	88	—	7	—	—	123	4	1	13	2	1	3	86	4	17	7	103		
1876					39,991,641	26,461	10,361,594	14,023,736	1,421,608	4	19	—	18	4	4	49	3	5	8	31	—	1	2	32	1	75	—	9	—	2	109	9	6	14	2	4	—	183	5	33	5	216	
1877					41,923,872	24,984	10,928,722	14,298,901	1,317,997	2	14	—	12	2	3	33	7	6	13	19	3	—	2	41	—	83	—	4	—	1	112	7	3	7	1	2	1	21	2	21	3	42	
1878					43,160,416	27,503	11,655,106	13,722,556	1,149,927	7	15	—	16	2	6	46	5	2	7	23	1	1	3	58	2	73	—	7	—	4	189	1	—	4	1	3	—	161	1	33	1	194	
IRELAND					16,327,416	19,271	5,701,062	2,673,967	849,007	2	4	—	11	2	—	19	5	5	10	4	1	2	1	2	—	17	1	2	—	—	3	—	—	—	—	—	9	2	5	2	14		
1873					16,342,306	19,402	5,942,044	2,790,632	769,787	1	5	—	13	1	—	20	3	8	11	—	2	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	38		
1874					16,535,378	18,648	5,444,127	2,509,266	1,476,900	2	—	—	3	2	1	8	2	5	6	8	—	1	1	3	—	14	—	1	—	—	—	—	—	—	—	—	—	—	—	—	41		
1875					16,573,661	20,737	5,381,463	2,534,532	1,652,318	1	3	—	4	6	—	14	1	5	6	5	3	1	1	3	—	17	—	4	—	—	—	—	—	—	—	—	—	—	—	—	25		
1876					17,256,953	22,290	6,024,707	2,840,153	893,718	1	1	—	7	—	—	9	2	5	5	1	1	1	1	3	—	11	—	1	—	—	—	—	—	—	—	—	—	—	—	—	31		
1877					17,296,746	30,922	6,220,973	3,000,443	949,398	—	3	—	15	2	2	22	1	1	2	3	—	—	7	12	1	28	—	1	—	—	—	—	—	—	—	—	—	—	—	—	39		
1878					17,981,146	30,104	6,354,575	3,114,983	933,335	2	6	—	10	2	1	21	3	2	5	—	—	2	1	19	1	17	—	3	—	—	—	—	—	—	—	—	—	—	—	—	83		
UNITED KINGDOM					492,374,322	272,342	92,956,354	94,963,818	3,051,577	55	163	—	96	37	13	364	38	31	69	115	31	8	16	62	11	162	1	13	3	3	217	7	31	20	1	11	19	1,233	42	213	61	1,445	
1873					465,320,188	314,579	94,944,067	99,306,025	3,103,057	51	155	—	85	41	20	352	47	35	82	102	25	5	12	30	5	133	1	3	—	—	—	—	—	—	—	—	—	—	—	—	61		
1874					477,540,411	493,957	96,749,963	100,023,939	3,708,371	55	183	—	97	40	21	386	81	74	155	195	52	6	8	55	13	229	1	23	3	4	403	10	8	28	12	11	80	1,614	46	371	126	1,885	
1875					504,975,234	537,257	100,731,071	104,635,066	4,162,039	55	179	—	87	75	29	425	84	60	144	293	79	20	14	660	112	479	6	29	7	5	476	88	17	21	8	36	19	1,180	21	289	39	1,458	
1876					538,237,206	*394,427	106,918,921	106,136,327	3,653,491	57	129	—	124	32	24	368	53	47	105	206	68	13	12	880	74	397	4	30	1	7	464	22	19	23	3	17	37	1,220	28	236	65	1,496	
1877					551,568,654	*397,556	106,675,380	107,399,987	2,820,464	45	110	—	92	19	27	263	27	25	52	173	50	4	14	918	37	548	2	14	3	7	395	34	19	4	16	13	668	22	154	35	893		
1878					565,024,455	*418,713	113,184,263	106,034,197	3,167,666	53	98	—	76	16	20	263	28	15	45	169	57	10	5	1,034	20	540	—	16	—	—	—	—	—	—	—	—	—	—	—	—	80	1,320	

* Since the year 1875 an alteration has been made in computing the number of season ticket holders, which has been the cause of the apparent decrease.

APPENDIX No. 4.—TABLE No. 1.

LENGTH OF RAILWAY open for all Public Traffic, and Length worked on the Absolute Telegraphic Block System, at the End of each of the Years 1873, 1874, 1875, 1876, 1877, and 1878, and Number of Miles run by all Trains for Public Traffic, and Number of Passengers (exclusive of Season Ticket Holders) and of Tons of Merchandise and Minerals carried, and Number of Accidents arising in the Working of the Railways,† and of Collisions included in those Accidents, in each of the Years 1873, 1874, 1875, 1876, 1877, and 1878.

	Length of Railway open for all Public Traffic at the End of each Year.				Length of Railway worked on the Absolute Telegraphic Block System at the End of each Year.			Number of Miles travelled by all Trains in each Year.	Number of Passengers carried in each Year (exclusive of Season-ticket Holders).	Tons. of Merchandise carried in each Year.	Accidents arising in the working of the Railways.†	Number of Collisions (included in previous Column).
	With a Single Line of Rails.	With a Double Line of Rails.*	With a Treble Line of Rails.	With a Quadruple Line of Rails.	TOTAL.	With a Single Line of Rails.	With a Double Line of Rails.	TOTAL.				
1873	England and Wales	4,231	6,966	1,111	61	1,315	3,911	5,226	401,465,086	162,820,330	342	191
	Scotland	1,564	1,048	—	—	689	290	979	37,512,796	24,975,944	84	53
	Ireland	1,600	501	—	—	—	12	12	16,342,306	3,157,183	33	9
	TOTAL	7,395	8,515	111	61	2,004	4,213	6,217	455,320,188	190,953,457	459	253
1874	England and Wales	4,429	6,980	1,119	94	1,708	4,578	6,281	423,083,941	160,922,000	520	269
	Scotland	1,652	1,048	—	—	758	384	1,092	38,220,892	24,495,740	70	46
	Ireland	1,619	508	—	—	—	13	13	16,535,578	3,121,112	13	4
	TOTAL	7,700	8,536	119	94	2,461	4,925	7,386	477,840,411	188,538,852	603	319
1875	England and Wales	4,460	7,078	1,117	134	1,880	5,091	6,921	451,082,641	168,975,743	569	289
	Scotland	1,661	1,060	—	—	775	422	1,197	39,068,932	27,789,694	56	24
	Ireland	1,639	509	—	—	2	13	15	16,873,661	3,354,214	23	5
	TOTAL	7,760	8,647	117	134	2,607	5,526	8,133	506,975,234	200,069,651	648	318
1876	England and Wales	4,398	7,311	96	184	2,012	5,736	7,748	480,339,391	173,691,738	467	214
	Scotland	1,653	1,063	—	—	799	521	1,320	39,991,641	28,753,140	57	26
	Ireland	1,642	515	—	—	5	15	20	17,356,263	3,520,186	15	4
	TOTAL	7,703	8,889	96	184	2,816	6,272	9,088	538,287,295	205,965,064	539	244
1877	England and Wales	4,458	7,342	104	194	2,206	6,046	8,252	492,404,036	178,872,570	322	155
	Scotland	1,708	1,068	—	—	848	586	1,434	41,922,872	29,435,188	49	23
	Ireland	1,676	526	1	—	5	27	32	17,266,746	3,672,737	24	4
	TOTAL	7,842	8,936	105	194	3,059	6,659	9,718	551,593,654	211,980,495	395	182
1878	England and Wales	4,493	7,446	112	200	2,251	6,360	8,614	503,982,893	175,244,154	283	141
	Scotland	1,737	1,108	—	—	950	644	1,594	43,160,416	27,923,038	54	27
	Ireland	1,713	549	1	—	5	74	79	17,881,146	3,568,664	26	11
	TOTAL	7,943	9,103	113	200	3,209	7,078	10,287	565,024,455	206,735,856	363	179

* The Act of Parliament under which the returns are made, from which these particulars are extracted, does not require the Companies to distinguish the length of the treble and quadruple lines, so that the number of miles may not be quite correct.

† The accidents arising in the working of the railways include : —
Collisions between passenger-trains or parts of passenger-trains.
Collisions between passenger-trains and goods or mineral-trains, engines, and vehicles standing foul of the line.
Collisions between goods trains or parts of goods trains.
Collisions between light engines.

Passenger trains or parts of passenger trains leaving the rails.
Goods trains or parts of goods trains, engines, &c. leaving the rails.
Trains or engines travelling in the wrong direction through points.
Trains running into stations or sidings at too high a speed.
Trains running through gates at level-crossings.

TABLE No. 2.

INCREASE PER CENT. of the LENGTH of LINE open for all Public Traffic, and of the Length of Line worked on the Absolute Block System, at the End of each of the Years 1874, 1875, 1876, 1877, and 1878, over that at the End of 1873; and Increase per Cent. of the Train Mileage run, and of the "Passengers" (exclusive of Season Ticket Holders) and of the Merchandize and Minerals carried in each of the Years 1874, 1875, 1876, 1877, and 1878, over the Train Mileage run and the "Passengers" and Merchandize and Minerals carried in 1873.

		Increase per Cent. of Length of Line open for all Public Traffic, at the End of each Year, over that at the End of 1873.	Increase per Cent. of Length of Line worked on the Absolute Block System at the End of each Year over that at the End of 1873.	Increase per Cent. of the Number of Miles travelled by all Trains in each Year over the Number travelled in 1873.	Increase per Cent. of the Number of Passengers carried in each Year (exclusive of Season Ticket Holders) over the Number carried in 1873.	Increase per Cent. of the Number of Tons of Minerals and Merchandize carried in each Year over the Number carried in 1873.
1874 over 1873	England and Wales -	2.2	20.2	2.2	5.4	-1.2
	Scotland -	3.4	11.5	-1.5	1.9	-1.9
	Ireland - - -	1.2	8.3	-0.6	1.2	-1.1
	TOTAL -	2.3	18.8	1.6	4.9	-1.3
1875 over 1873	England and Wales -	3.7	32.4	7.4	12.3	3.8
	Scotland - - -	4.2	22.3	0.5	4.1	11.1
	Ireland - - -	2.2	25.0	0.9	3.3	6.2
	TOTAL -	3.6	30.8	6.2	11.3	4.8
1876 over 1873	England and Wales -	5.5	48.3	10.8	19.8	6.7
	Scotland - - -	4.4	34.8	2.0	6.6	15.1
	Ireland - - -	2.7	66.7	2.9	6.2	11.5
	TOTAL -	4.9	46.2	9.3	18.2	7.9
1877 over 1873	England and Wales -	6.4	57.9	12.8	22.7	9.9
	Scotland - - -	6.3	46.5	4.8	11.8	17.9
	Ireland - - -	4.9	166.7	6.3	5.7	16.3
	TOTAL -	6.2	56.3	11.4	21.1	11.0
1878 over 1873	England and Wales -	7.8	64.8	13.9	25.5	7.6
	Scotland - - -	8.9	62.8	5.9	15.1	11.8
	Ireland - - -	7.7	558.3	9.7	9.4	18.3
	TOTAL -	7.9	65.5	12.7	24.1	8.3

TABLE No. 3.

PER-CENTAGE of LENGTH of LINE open for all Public Traffic worked on the Absolute Telegraphic Block System, at the End of each of the Years 1873, 1874, 1875, 1876, 1877, and 1878, and Per-centage of Accidents arising in the Working of the Railways from Collisions in each of the same Years.

		Per-centage of Single-line worked on the Absolute Block System.	Per-centage of Double or more Lines worked on the Absolute Block System.	Per-centage of Total Length of Line worked on the Absolute Block System.	Per-centage of Accidents from Collisions.
1873	England and Wales -	31.1	54.8	46.0	55.8
	Scotland -	44.1	27.7	37.5	63.1
	Ireland -	—	2.4	0.6	27.3
	TOTAL -	27.1	48.5	38.7	55.1
1874	England and Wales -	38.5	63.6	54.0	51.7
	Scotland -	45.9	31.9	40.4	65.7
	Ireland -	—	2.6	0.6	30.8
	TOTAL -	32.0	56.3	44.9	52.9
1875	England and Wales -	41.0	69.5	58.7	50.8
	Scotland -	46.7	39.8	44.0	42.9
	Ireland -	0.1	2.6	0.7	21.7
	TOTAL -	33.6	62.1	48.8	49.1
1876	England and Wales -	45.7	75.6	64.6	45.8
	Scotland -	48.0	49.0	48.4	45.6
	Ireland -	0.3	2.9	0.9	26.7
	TOTAL -	36.6	68.4	53.9	45.3
1877	England and Wales -	49.5	79.1	68.2	48.1
	Scotland -	49.6	54.9	51.7	46.9
	Ireland -	0.3	5.1	1.5	16.7
	TOTAL -	39.0	72.1	56.9	46.1
1878	England and Wales -	50.2	82.0	70.3	49.8
	Scotland -	54.7	58.1	56.0	50.0
	Ireland -	0.3	13.5	3.5	42.3
	TOTAL -	40.4	75.2	59.3	49.3

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For Her Majesty's Stationery Office.

RAILWAY ACCIDENTS.

RETURNS

OF

ACCIDENTS AND CASUALTIES

**AS REPORTED TO THE BOARD OF TRADE BY THE SEVERAL RAILWAY COMPANIES
IN THE UNITED KINGDOM,**

During the nine months ending 30th September 1878,

In pursuance of the Regulation of Railways Act (1871), 34 & 35 Vict. cap. 78;

TOGETHER WITH

**REPORTS OF THE INSPECTING OFFICERS OF THE
RAILWAY DEPARTMENT TO THE BOARD OF TRADE**

UPON

CERTAIN ACCIDENTS

Which were inquired into.

Presented to both Houses of Parliament by Command of Her Majesty.



LONDON:

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1879.

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Summary of Accidents and Casualties which have been reported to the Board of Trade as having occurred upon the Railways in the United Kingdom, during the nine months ending 30th September 1878.

I.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c.

Accidents to trains, rolling-stock, permanent-way, &c. caused the death of 17 persons, and injury to 1,020, viz. :—

	Killed.	Injured.
Passengers - - - - -	11	922
Servants of companies - - - - -	6	98
Total - - - - -	17	1,020

During the nine months there were reported 37 collisions between passenger-trains or parts of passenger-trains, by which 281 passengers and 13 servants were injured; 56 collisions between passenger-trains and goods or mineral-trains, engines, &c., by which 6 passengers were killed, and 474 passengers and 16 servants were injured; 17 collisions between goods-trains or parts of goods-trains, by which 2 servants were killed, and 19 were injured; 53 cases of passenger-trains or parts of passenger-trains leaving the rails, by which 5 passengers and 2 servants were killed, and 103 passengers and 5 servants were injured; 10 cases of goods-trains or parts of goods-trains leaving the rails, by which 2 servants were killed and 23 were injured; 15 cases of trains or engines travelling in the wrong direction through points, by which 12 passengers and 8 servants were injured; 14 cases of trains running into stations or sidings at too high a speed, by which 36 passengers and 1 servant were injured; 122 cases of trains running over cattle or other obstructions on the line, by which 2 servants were injured; 7 cases of the bursting of boilers or tubes, &c. of engines, by which 8 servants were injured; the failure of 383 axles, causing injury to 2 passengers; 14 cases of the failure of couplings, causing injury to 7 passengers and 2 servants; the fracture of 272 rails, causing injury to 5 passengers; and 5 accidents of a miscellaneous description, causing injury to 2 passengers and 1 servant.

There were also reported 1 case of a train coming in contact with a projection from another train travelling on a parallel line; 31 cases of trains running through gates at level-crossings; 4 cases of the failure of machinery, springs, &c. of engines; the failure of 681 tyres, 13 wheels, 3 tunnels, bridges, viaducts, &c.; 16 cases of the flooding of portions of the permanent-way; 13 cases of slips in cuttings or embankments; 7 cases of fires in trains, and 3 at stations; but in none of these was any personal injury involved.

Of the 681 tyres which failed, 43 were engine-tyres, 15 were tender-tyres, 9 were carriage-tyres, 23 were van-tyres, and 591 were wagon-tyres; of the wagons, 372 belonged to owners other than the railway companies; 548 tyres were made of iron, and 131 of steel, whilst in 2 cases the material was not stated; 44 tyres were fastened to their wheels by Gibson's patent method, 1 of which left its wheel when it failed; 15 were fastened by Beattie's patent, and 5 by Mansell's patent, but none of these left their wheels; 609 tyres were fastened to their wheels by bolts or rivets, and of these 6 left their wheels when they failed; while the remaining 8, of which 2 left their wheels when they failed, were secured by various other methods; 59 tyres broke at rivet-holes, 165 in the solid, 39 at the weld, and 418 split longitudinally or bulged.

Of the 383 axles which failed, 204 were engine-axles, viz., 191 crank or driving, and 13 leading or trailing; 11 were tender-axles, 3 were carriage-axles, 157 were wagon-axles, and 8 were axles of salt-vans. 47 wagons and the salt-vans belonged to owners other than the railway companies. Of the crank or driving-axles, 153 were made of iron, and 37 of steel, and in 1 case the material was not stated; and the average mileage of 142 of the iron axles was 170,957 miles, and of 31 of the steel axles 128,246 miles.

Of the 272 rails which were found fractured in the permanent-way, 200 were double-headed, 56 were single-headed, 8 were of Vignoles' section, 5 were bridge rails, and the form of the remaining 3 was not stated; 141 were made of iron, and 130 of steel, and in 1 case the material was not stated; of the double-headed rails, 118 had been turned.

II.—ACCIDENTS TO PASSENGERS FROM CAUSES OTHER THAN ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., INCLUDING ACCIDENTS FROM THEIR OWN WANT OF CAUTION OR MISCONDUCT; ACCIDENTS TO PERSONS PASSING OVER LEVEL-CROSSINGS; TRESPASSERS; AND OTHERS.

Of the 357 persons killed and 603 injured in this division, 71 of the killed and 416 of the injured were passengers. Of the latter 36 were killed and 72 injured by falling between carriages and platforms; 6 were killed and 249 injured by falling on to platforms, ballast, &c., when getting into or alighting from trains; 21 were killed and 13 injured whilst passing over the line at stations; 35 were injured by the closing of carriage-doors; 2 were killed and 23 were injured by falling out of carriages during the travelling of trains; and 6 were killed and 24 injured from other causes. 40 persons were killed and 13 injured whilst passing over the line at level-crossings, viz., 25 killed and 11 injured at public level-crossings, 10 killed and 1 injured at occupation crossings, and 5 killed and 1 injured at foot-crossings. 170 persons were killed and 107 injured when trespassing on the railways. 48 persons committed suicide on railways. And of other persons not specifically classed, but mostly private people having business on the Companies' premises, 28 were killed and 67 injured.

III.—ACCIDENTS TO SERVANTS IN THE EMPLOY OF RAILWAY COMPANIES OR CONTRACTORS, CAUSED BY THE TRAVELLING OF TRAINS OR THE MOVEMENT OF VEHICLES USED EXCLUSIVELY UPON RAILWAYS.

During the nine months there were 377 servants of companies or contractors reported as having been killed and 1,371 injured,* in addition to those included in Class I. Of these 34 were killed and 231 injured whilst coupling or uncoupling vehicles; 5 were killed and 31 injured by coming in contact, whilst riding on vehicles during shunting, with other vehicles, &c., standing on adjacent lines; 3 were killed and 31 injured whilst passing over or standing upon buffers during shunting; 27 were killed and 155 injured in getting on or off, or by falling off engines, wagons, &c. during shunting; 6 were killed and 108 injured whilst breaking, spragging, or chocking wheels; 6 were killed and 29 injured whilst attending to ground points, marshalling trains, &c.; 4 were killed and 78 injured whilst moving vehicles by capstans, turn-tables, props, &c., during shunting, and 7 were killed and 115 injured by various other accidents during shunting operations; 12 were killed and 33 injured by falling off engines, &c., during the travelling of trains; 8 were killed and 34 injured by coming in contact with over-bridges or erections on the sides of the line during the travelling of trains; 10 were killed and 33 injured whilst getting on or off engines, vans, &c. during the travelling of trains; 7 were killed and 61 injured whilst attending to, or by the failure of, machinery, &c. of engines in steam; 73 were killed and 102 injured whilst working on the permanent-way, sidings, &c.; 5 were killed whilst attending to gates at level-crossings; 81 were killed and 122 injured whilst walking, crossing, or standing on the line on duty; 35 were killed and 101 injured by being caught between vehicles; 17 were killed and 66 injured by falling or being caught between trains and platforms, walls, &c.; 36 were killed and 7 injured whilst walking, &c. on the line on the way home or to work; and 1 was killed and 34 were injured from various other causes.

Altogether, the numbers of persons killed and injured on railways in the United Kingdom in the course of public traffic, during the nine months ending September 30, 1878, as reported to the Board of Trade, were as follows:—

	Killed.	Injured.
Passengers :		
From accidents to trains, rolling-stock, permanent-way, &c.	11	922
By accidents from other causes	71	416
Servants of companies or contractors :		
From accidents to trains, rolling stock, permanent-way, &c.	6	98
By accidents from other causes	377	1,371
Persons passing over railways at level-crossings	40	13
Trespassers (including suicides)	218	107
Other persons not coming in above classification	28	67
Total	751	2,994

* For a classification of the injuries, see Table No. 6.

Note.—In addition to the above, the Railway Companies have reported to the Board of Trade, in pursuance of the 6th Section of the Regulation of Railways Act, 1871, the following accidents which occurred upon their premises, but in which the movement of vehicles used exclusively upon railways was not concerned, namely :—2 passengers killed and 60 injured whilst ascending or descending steps at stations ; 19 injured by being struck by barrows, falling over packages, &c. on station platforms ; 1 killed and 19 injured by falling off platforms ; and 30 injured from other causes. Of servants of companies or contractors 3 were killed, and 294 injured whilst loading, unloading, or sheeting wagons ; 92 were injured whilst moving or carrying goods in warehouses, &c. ; 3 were killed and 67 injured whilst working at cranes or capstans ; 3 were killed and 99 injured by the falling of wagon-doors, lamps, bales of goods, &c. ; 2 were killed and 239 injured by falling off, or when getting on or off, stationary engines or vehicles ; 6 were killed and 88 injured by falling off platforms, ladders, scaffolds, &c. ; 96 were injured by stumbling whilst walking on the line or platforms ; 1 was killed and 35 were injured whilst attending to stationary engines in sheds ; 3 were killed and 36 injured by being trampled on or kicked by horses ; 7 were killed and 128 injured whilst working on the line or in sidings ; and 3 were killed and 100 injured from various other causes. 12 persons who were transacting business on the companies' premises were killed and 56 injured, making a total in this class of accidents of 46 persons killed and 1,458 injured.

Thus the total numbers of personal accidents reported to the Board of Trade by the several railway companies during the nine months, amount to 797 persons killed and 4,452 injured.

TABLE No. 1.

GENERAL TOTAL.

NUMBER of PERSONS reported, during the Nine Months ending 30th September 1878, as KILLED or INJURED on the Railways of the UNITED KINGDOM, distinguishing between PASSENGERS, SERVANTS of the COMPANIES or of CONTRACTORS, and OTHER PERSONS ; and distinguishing also in the case of the Two former Classes between ACCIDENTS caused by ACCIDENTS to TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., and ACCIDENTS happening otherwise.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
From accidents to trains, rolling-stock, permanent-way, &c. -	7	705	-	143	4	74	11	922
By accidents from other causes, including accidents from their own want of caution, or misconduct - - -	62	376	5	30	4	10	71	416
SERVANTS :—								
From accidents to trains, rolling-stock, permanent-way, &c. -	4	74	-	20	2	4	6	98
By accidents from other causes, including accidents from their own want of caution, or misconduct - - -	313	1,122	47	230	17	19	377	1,371
OTHER PERSONS :—								
Whilst passing over railways at level-crossings - - -	34	12	3	-	3	1	40	13
Trespassers - - - -	140	100	19	5	11	2	170	107
Suicides - - - - -	39	-	6	-	3	-	48	-
Miscellaneous, not included in either of the above - -	26	56	1	9	1	2	28	67
TOTAL - - -	625	2,445	81	437	45	112	751	2,994

N.B.—The Board of Trade state the cause of accident as returned by the Companies, but do not guarantee or otherwise adopt the statement, except in cases where an official inquiry has been held.

TABLE No. 2.

NUMBER of PERSONS reported, during the Nine Months ending 30th September 1878, as KILLED or INJURED in the UNITED KINGDOM by the TRAVELLING of TRAINS or the MOVEMENT of VEHICLES used exclusively upon Railways, distinguishing between PASSENGERS, SERVANTS of RAILWAY COMPANIES, and OTHER PERSONS, and classifying as far as practicable the Nature and Causes of the Accidents occasioning the Death or Injury.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
From accidents to trains, &c., <i>see Table No. 3.</i>	7	705	—	143	4	74	11	922
From falling between trains and platforms	32	59	2	10	2	8	36	72
From falling on to the platform, ballast, &c. when getting into or out of trains	5	231	1	14	—	4	6	249
Whilst crossing the line at stations	20	11	—	2	1	—	21	13
By the closing of carriage doors	—	35	—	—	—	—	—	35
From falling out of carriages during the travelling of trains	1	17	—	3	1	8	2	23
By other accidents	4	23	2	1	—	—	6	24
TOTAL	69	1,081	5	173	8	84	52	1,338
SERVANTS :—								
From accidents to trains, &c., <i>see Table No. 3.</i>	4	74	—	20	2	4	6	98
Whilst coupling or uncoupling vehicles	26	175	5	50	3	6	34	231
By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines	3	21	2	9	—	1	5	31
Whilst passing over or standing upon buffers during shunting	3	20	—	11	—	—	3	31
When getting on or off or falling off engines, waggons, &c., during shunting	19	126	8	27	—	2	27	155
Whilst breaking, spragging, or chocking wheels	6	94	—	13	—	1	6	108
Whilst attending to ground-points, marshalling trains, &c.	5	23	1	6	—	—	6	29
Whilst moving vehicles by capstans, turntables, props, &c., during shunting	2	65	2	13	—	—	4	78
By other accidents during shunting operations, not included in the preceding	7	93	—	21	—	1	7	115
From falling off engines, &c., during the travelling of trains	11	25	1	8	—	—	12	33
By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains	8	26	—	8	—	—	8	34
When getting on or off engines, vans, &c., during the travelling of trains	8	26	2	6	—	1	10	33
Whilst attending to, or by the failure of machinery, &c. of engines in steam	5	49	2	12	—	—	7	61
Whilst working on the permanent-way, sidings, &c.	60	89	7	12	6	1	73	102
Whilst attending to gates at level-crossings	5	—	—	—	—	—	5	—
Whilst walking, crossing, or standing on the line on duty	70	107	7	14	4	1	81	122
From being caught between vehicles	27	94	5	5	3	2	35	101
From falling or being caught between trains and platforms, walls, &c.	15	56	2	7	—	3	17	66
Whilst walking, &c., along the line on the way home or to work	32	6	3	1	1	—	36	7
Miscellaneous	1	27	—	7	—	—	1	34
TOTAL	317	1,196	47	250	19	23	383	1,469
OTHER PERSONS :—								
Whilst passing over railways at level crossings	34	12	3	—	8	1	40	13
Trespassers	140	100	19	5	11	2	170	107
Suicides	39	—	6	—	3	—	48	—
Miscellaneous	26	56	1	9	1	2	28	67
TOTAL	239	168	29	14	18	5	286	187
SUMMARY :—								
Passengers	69	1,081	5	173	8	84	52	1,338
Servants	317	1,196	47	250	19	23	383	1,469
Other persons	239	168	29	14	18	5	286	187
TOTAL ALL CLASSES	625	2,445	81	437	45	112	751	2,994

TABLE No. 3.

ACCIDENTS to TRAINS, ROLLING STOCK, PERMANENT WAY, &c., reported, during the Nine Months ending 30th September 1878, as having occurred on the RAILWAYS in the UNITED KINGDOM, distinguishing the different Classes of Accident, and the Number of Passengers and others, and of Servants of Railway Companies, KILLED or INJURED in each Class of Accident.

	NUMBER OF CASES.				NUMBER OF PASSENGERS AND OTHERS.								NUMBER OF SERVANTS.							
	Eng-land and Wales.	Scot-land.	Ire-land.	United King-dom.	England and Wales.		Scotland.		Ireland.		United Kingdom.		England and Wales.		Scotland.		Ireland.		United Kingdom.	
					Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.
Collisions between passenger trains or parts of passenger trains - - -	31	5	1	37	-	186	-	95	-	-	-	281	-	13	-	-	-	-	-	13
Collisions between passenger trains and goods or mineral trains, engines, and vehicles standing foul of the line -	43	10	3	56	5	443	-	14	1	17	6	474	-	14	-	-	-	2	-	16
Collisions between goods trains or parts of goods trains -	13	2	2	17	-	-	-	-	-	-	-	-	2	16	-	2	-	1	2	19
Trains coming in contact with projections from other trains travelling on parallel lines -	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Passenger trains or parts of passenger trains leaving the rails - - -	38	9	6	53	2	41	-	10	3	52	5	103	-	5	-	-	2	-	2	5
Goods trains or parts of goods trains, engines, &c. leaving the rails - - -	7	1	2	10	-	-	-	-	-	-	-	-	2	9	-	14	-	-	2	23
Trains or engines travelling in the wrong direction through points - - -	10	2	3	15	-	12	-	-	-	-	-	12	-	8	-	-	-	-	-	8
Trains running into stations or sidings at too high a speed - - -	9	5	-	14	-	18	-	18	-	-	-	36	-	1	-	-	-	-	-	1
Trains running over cattle or other obstructions on the line	107	15	-	122	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	2
Trains running through gates at level-crossings - -	31	-	-	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The bursting of boilers or tubes, &c. of engines -	4	1	2	7	-	-	-	-	-	-	-	-	-	5	-	3	-	-	-	8
The failure of machinery, springs, &c. of engines -	1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The failure of tyres - -	645	30	6	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " wheels - - -	11	2	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " axles - - -	331	42	10	383	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-
" " break apparatus -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " couplings - - -	6	5	3	14	-	1	-	1	-	5	-	7	-	1	-	-	-	1	-	2
" " ropes used in working inclines -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " tunnels, bridges, viaducts, culverts, &c. -	-	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leaking rails - - -	204	68	-	272	-	-	-	5	-	-	-	5	-	-	-	-	-	-	-	-
The flooding of portions of permanent-way - - -	15	1	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " in cuttings or embankments - - -	13	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " on trains - - -	3	4	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Accidents at stations, or involving injury to bridges or viaducts -	2	1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Accidents - - -	4	1	-	5	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
TOTAL -	-	-	-	-	7	705	-	143	4	74	11	922	4	74	-	20	2	4	6	98

TABLE No. 4.

ACCIDENTS TO TRAINS, ROLLING STOCK, PERMANENT WAY, &c. on the RAILWAYS in the UNITED KINGDOM, reported
RAILWAYS on which the same have occurred, and the Number of Passengers and others, and of

NAME OF COMPANY.	Col- lisions between pas- senger trains or parts of pas- senger trains.	Col- lisions between pas- senger trains, and goods or mineral trains, &c.	Col- lisions between goods trains or parts of goods trains.	Trains coming in contact with pro- jections from other trains travel- ling on parallel lines.	Pas- senger trains or parts of pas- senger trains leaving the rails.	Goods trains or parts of goods trains, &c. leaving the rails.	Trains or engines travel- ling in the wrong direction through points.	Trains running into stations or sidings at too high a speed.	Trains running over cattle or other obstruc- tions on the line.	Trains running through gates at level- cross- ings.	The bursting of boilers or tubes, &c. of engines.	The failure of ma- chinery, springs, &c. of engines.	The failure of tyres.
ENGLAND AND WALES.													
Bishops Castle -	-	-	-	-	1	-	-	-	-	-	-	-	-
Brecon and Merthyr -	-	-	-	-	1	-	-	-	-	-	-	-	1
Cambrian -	-	1	-	-	2	-	-	-	-	2	-	-	1
Festiniog -	-	-	1	-	-	1	-	-	-	-	-	-	-
Furness -	-	-	-	-	1	-	-	-	-	-	-	-	10
Great Eastern -	5	6	1	-	2	-	-	-	16	17	-	-	13
Great Northern -	1	2	1	-	2	-	-	-	2	1	-	-	2
Great Western -	2	2	-	-	3	1	3	2	22	5	-	-	61
Isle of Wight -	-	-	-	-	-	-	-	-	-	-	-	-	3
Lancashire and Yorkshire -	5	7	3	-	6	1	1	2	9	-	1	1	10
London and North-Western	8	15	1	-	8	-	1	1	15	3	3	-	124
London and North-Western and Great Western Joint	-	-	-	-	1	1	-	-	1	-	-	-	-
London and South-Western	-	-	-	-	1	-	1	-	-	-	-	-	2
London, Brighton, and South Coast -	-	1	-	-	1	-	-	2	1	-	-	-	8
London, Chatham, and Dover -	-	1	-	-	-	-	-	1	-	-	-	-	2
London, Tilbury, and South- end -	-	1	-	-	-	-	-	-	-	-	-	-	-
Londonderry, Seaham and Sunderland -	-	-	-	-	1	-	-	-	-	-	-	-	-
Manchester and Milford -	-	-	-	-	-	1	-	-	-	-	-	-	-
Manchester, Sheffield and Lincolnshire -	-	-	-	-	-	1	-	-	1	-	-	-	2
Maryport and Carlisle -	-	-	1	-	-	-	-	-	-	-	-	-	-
Metropolitan -	2	-	1	-	-	-	-	-	-	-	-	-	-
Metropolitan District -	1	-	-	-	3	-	1	-	-	-	-	-	-
Midland -	-	4	1	-	-	-	1	-	-	-	-	-	8
Mid-Wales -	-	-	-	-	-	-	-	-	1	-	-	-	1
Monmouthshire -	-	-	-	-	1	-	-	-	12	-	-	-	-
Northampton and Banbury -	-	-	-	-	-	-	-	-	-	-	-	-	-
North-Eastern -	1	3	1	-	1	-	1	-	26	-	-	-	9
North London -	2	-	-	-	-	-	-	-	-	-	-	-	-
North Staffordshire -	-	-	-	-	-	-	-	-	-	-	-	-	16
North Wales Narrow Gauge	1	-	-	-	1	-	-	-	-	-	-	-	-
Oldham, Ashton-under- Lyne, and Guide Bridge Junction -	-	-	-	-	-	-	-	-	-	-	-	-	-
Potteries, Shrewsbury, and North Wales -	-	-	-	-	1	-	-	-	-	-	-	-	-
Preston and Wyre -	1	-	-	-	-	-	-	-	1	-	-	-	-
Rhymney -	-	-	2	-	-	1	-	-	-	-	-	-	-
Severn and Wye -	-	-	-	-	-	-	1	-	-	-	-	-	-
Sheffield and Midland Com- mittee -	-	-	-	-	-	-	-	-	-	-	-	-	-
South-Eastern -	2	-	-	-	1	-	-	1	-	1	-	-	-
Vale of Towy -	-	-	-	-	-	-	-	-	-	2	-	-	-
Whitehaven, Cleator, and Egremont -	-	-	-	-	-	-	-	-	-	-	-	-	-
Private Owners -	-	-	-	-	-	-	-	-	-	-	-	-	872
TOTAL -	31	43	13	-	38	7	10	9	107	31	4	1	645

TABLE No. 4

during the Nine Months ending 30th September 1878, distinguishing the different CLASSES of ACCIDENTS, the different Servants of Railway Companies, KILLED or INJURED on each Railway by those Accidents.

The failure of wheels.	The failure of axles.	The failure of break apparatus.	The failure of couplings.	The failure of ropes used in working inclines.	The failure of tunnels, bridges, viaducts, or culverts.	Broken rails.	The flooding of portions of permanent way.	Slips in cuttings or embankments.	Fire in trains.	Fire at stations or involving injury to bridges or viaducts.	Other accidents.	Number of Passengers and others.		Number of Servants.		Total all Classes.	
												Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	2	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	20	-	-	-	-	8	11	-	1	2	-	-	96	-	6	-	102
-	9	-	-	-	-	17	-	-	-	-	-	-	25	-	9	-	34
-	60	-	-	-	-	12	1	6	1	-	1	-	28	-	5	-	33
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	16	-	2	-	-	15	-	-	-	-	-	-	19	1	11	1	30
-	35	-	1	-	-	-	2	3	-	-	2	-	71	-	18	-	84
-	-	-	-	-	-	3	-	-	-	-	-	2	12	-	8	2	20
-	9	-	-	-	-	22	-	1	-	-	-	-	6	-	-	-	6
-	15	-	1	-	-	18	-	-	-	-	-	-	233	-	-	-	233
-	6	-	-	-	-	35	-	-	-	-	-	5	83	-	-	5	83
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	16	-	-	-	-	9	-	-	-	-	-	-	-	1	-	1	-
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	3	-	18
-	-	-	1	-	-	3	-	-	-	-	-	-	1	-	-	-	1
-	28	-	-	-	-	46	-	-	1	-	-	-	20	-	6	-	26
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	50	-	-	-	-	11	1	2	-	-	-	-	61	1	2	1	63
-	-	-	-	-	-	1	-	-	-	-	-	-	21	-	3	-	24
-	9	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	1	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	331	-	6	-	-	204	15	13	3	2	4	7	705	4	74	11	779

TABLE No. 4.—Number of Accidents to Trains,

NAME OF COMPANY.	Col- lisions between pas- senger trains or parts of pas- senger trains.	Col- lisions between pas- senger trains, and goods or mineral trains, engines, &c.	Col- lisions between goods trains or parts of goods trains.	Trains coming in contact with pro- jections from other trains travel- ing on parallel lines.	Pas- senger trains or parts of pas- senger trains leaving the rails.	Goods trains or parts of goods trains, &c., leaving the rails.	Trains or engines travel- ing in the wrong direction through points.	Trains running into stations or sidings at too high a speed.	Trains running over cattle or other obstruc- tions on the line.	Trains running through gates at level- cross- ings.	The bursting of boilers or tubes, &c. of engines.	The failure of ma- chinery, springs, &c. of engines.	The failure of tyres.
SCOTLAND.													
Caledonian - - -	3	5	1	-	6	-	1	4	5	-	-	-	19
City of Glasgow Union -	-	1	-	-	-	-	-	-	-	-	-	-	-
Glasgow and Paisley Joint	1	-	-	-	-	1	-	-	-	-	-	-	-
Glasgow and South-Western	-	1	1	-	-	-	-	-	1	-	-	-	3
Great North of Scotland -	-	-	-	-	1	-	1	-	1	-	1	2	2
North British - - -	1	3	-	-	2	-	-	1	8	-	-	-	6
Private Owners - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL - - -	5	10	2	-	9	1	2	5	15	-	1	2	30
IRELAND.													
Ballymena and Larne -	-	-	-	-	1	-	-	-	-	-	-	-	-
Ballymena, Cushendall, and Red Bay - - -	-	-	-	-	-	-	-	-	-	-	-	-	2
Belfast and County Down -	-	-	-	-	1	-	-	-	-	-	-	-	-
Belfast and Northern Coun- ties - - -	-	-	-	-	1	1	-	-	-	-	-	1	-
Cork and Bandon -	-	-	-	-	-	-	-	-	-	-	-	-	-
Cork and Macroom -	-	-	-	-	1	-	-	-	-	-	-	-	-
Dublin, Wicklow, and Wex- ford - - -	-	1	1	-	-	-	1	-	-	-	-	-	-
Great Northern of Ireland -	1	1	-	-	1	-	-	-	-	-	-	-	-
Great Southern and Western	-	-	1	-	1	-	-	-	-	-	-	-	-
Midland Great Western -	-	-	-	1	-	-	-	-	-	-	-	-	4
Newry and Armagh - - -	-	-	-	-	-	-	1	-	-	-	-	-	-
Waterford and Limerick -	-	1	-	-	-	1	-	-	-	-	2	-	-
Waterford and Tramore	-	-	-	-	-	-	1	-	-	-	-	-	-
TOTAL - - -	1	3	2	1	6	2	3	-	-	-	2	1	6
TOTAL UNITED KINGDOM	37	56	17	1	53	10	15	14	122	31	7	4	681

Rolling Stock, Permanent Way, &c.—continued.

The failure of wheels.	The failure of axles.	The failure of break apparatus.	The failure of couplings.	The failure of ropes used in working inclines.	The failure of tunnels, bridges, viaducts, or culverts.	Broken rails.	The flooding of portions of permanent way.	Slips in cuttings or embankments.	Fire in trains.	Fire at stations, or involving injury to bridges or viaducts.	Other accidents.	Number of Passengers and others.		Number of Servants.		Total all Classes.	
												Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	26	-	3	-	-	34	-	-	4	-	1	-	38	-	2	-	40
-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	4
-	-	-	-	-	1	1	-	-	-	-	-	-	39	-	14	-	53
-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	4	-	12
2	11	-	2	-	2	32	1	-	-	1	-	-	54	-	-	-	54
-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	42	-	5	-	3	68	1	-	4	1	1	-	143	-	20	-	163
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	3	50	2	-	5	50
-	-	-	1	-	-	-	-	-	-	-	-	1	15	-	2	1	17
-	4	-	1	-	-	-	-	-	-	-	-	-	9	-	1	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	10	-	3	-	-	-	-	-	-	-	-	4	74	2	4	6	78
13	323	-	14	-	3	272	16	13	7	3	5	11	922	6	98	17	1,020

TABLE No. 5.

NUMBER of SERVANTS of RAILWAY COMPANIES and CONTRACTORS reported, during the Nine Months ending 30th September used exclusively upon Railways, distinguishing the Number which have occurred on each Railway or System of Railway,

NAME OF COMPANY.	From accidents to trains, &c. See Table No. 4.		Whilst coupling or uncoupling vehicles.		By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines.		Whilst passing over, or standing upon, buffers during shunting.		When getting on or off, or falling off engines, wagons, &c. during shunting.		Whilst breaking, spragging, or chocking wheels.		Whilst attending to ground-points, marshalling trains, &c.		Whilst moving vehicles by capstans, turn-tables, props, &c. during shunting.		By other accidents during shunting operations, not included in the preceding.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
ENGLAND AND WALES.																		
Brecon and Merthyr - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cambrian - - -	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Cardiff and Cardigan - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cornwall - - -	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Festiniog - - -	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Furness - - -	-	-	-	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Great Eastern - - -	-	6	2	10	-	-	1	3	1	3	-	7	-	-	-	4	-	9
Great Northern - - -	-	9	1	14	-	1	-	-	-	9	-	1	1	3	-	-	2	8
Great Western - - -	-	5	2	34	-	4	1	6	2	24	2	13	-	2	-	5	-	7
Lancashire and Yorkshire - - -	-	10	5	18	1	3	-	2	2	15	-	21	1	4	-	17	-	18
London and North-Western - - -	1	14	3	37	1	4	1	3	5	27	2	18	1	6	2	27	-	17
London and North-Western and Great Western Joint - - -	-	8	-	6	-	2	-	-	-	4	-	-	1	-	-	-	1	2
London and South-Western - - -	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
London and South-Western, and London, Brighton, and South Coast - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
London, Brighton, and South Coast - - -	-	-	2	3	-	-	-	-	3	4	-	4	-	1	-	1	1	3
London, Chatham, and Dover - - -	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	4	-	1
London, Tilbury, and Southend - - -	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manchester, Sheffield, and Lincolnshire - - -	1	-	1	6	-	3	-	2	-	6	-	10	-	1	-	2	-	5
Maryport and Carlisle - - -	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Metropolitan - - -	-	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Metropolitan and St. John's Wood - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metropolitan District - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Midland - - -	-	6	3	19	-	2	-	1	3	14	-	5	1	3	-	-	2	7
Midland and Great Western Joint - - -	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Monmouthshire - - -	-	-	-	2	-	-	-	1	-	2	-	3	-	-	-	-	-	-
North-Eastern - - -	1	2	3	18	1	1	-	2	2	11	1	6	-	1	-	5	1	13
North London - - -	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Staffordshire - - -	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE No. 5.

1878, as KILLED or INJURED in the UNITED KINGDOM by the TRAVELLING of TRAINS or the MOVEMENT of VEHICLES and classifying as far as practicable the Nature and Causes of the Accidents occasioning the Death or Injury.

From falling off engines, &c., during the travelling of trains.		By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains.		When getting on or off engines, vans, &c., during the travelling of trains.		Whilst attending to, or by the failure of, machinery, &c., of engines in steam.		Whilst working on the permanent way, sidings, &c.		Whilst attending to gates at level-crossings.		Whilst walking, crossing, or standing on the line on duty.		From being caught between vehicles.		From falling or being caught between trains and platforms, walls, &c.		Whilst walking, &c., on the line on the way home, or to work.		Miscellaneous.		TOTAL.	
Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	1	-	-	1	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	2	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-
-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	-	-	-	-	-	6
1	2	-	-	1	-	1	-	1	7	1	-	1	6	-	5	-	4	2	-	-	4	12	70
-	3	-	2	1	1	1	3	4	6	-	-	6	4	1	7	-	3	1	-	-	1	18	75
-	3	2	7	1	6	1	7	6	18	1	-	13	22	3	17	1	9	5	1	-	6	40	196
2	3	-	3	-	4	1	20	3	7	-	-	5	15	3	15	-	5	2	2	-	5	25	187
2	3	-	5	3	5	-	10	10	12	1	-	15	26	5	16	4	14	10	-	-	3	66	247
-	1	-	-	-	-	-	-	1	1	-	-	-	1	1	2	1	-	1	-	-	-	6	27
-	1	2	-	1	-	-	-	5	1	2	-	2	2	2	3	1	1	2	-	-	-	18	9
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
-	-	-	1	-	-	-	-	4	7	-	-	4	3	2	1	1	2	1	-	-	1	18	31
-	-	2	-	-	-	-	-	3	4	-	-	-	4	-	3	-	-	-	-	-	2	5	20
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2
-	-	-	1	-	3	-	-	3	1	-	-	2	3	1	2	-	5	-	-	-	-	8	50
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	3	-	-	-	-	-	13
-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	2	-
-	4	1	-	-	2	-	-	7	10	-	-	11	10	3	15	3	3	3	3	-	-	37	104
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	1
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
3	2	1	3	1	5	-	7	3	7	-	-	6	4	2	6	1	4	3	-	-	2	29	99
-	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	2	6
1	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	5	-

TABLE No. 5.—Number of Servants reported

NAME OF COMPANY.	From acci- dents to trains, &c. See Table No. 4.		Whilst coupling or uncoupling vehicles.		By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines.		Whilst passing over, or standing upon buffers during shunting.		When getting on or off, or falling off, engines, waggons, &c. during shunting.		Whilst breaking, spragging, or chocking wheels.		Whilst attending to ground- points, marshalling trains, &c.		Whilst moving vehicles by capstans, turn-tables, props, &c. during shunting.		By other accidents during shunting operations not included in the preceding.	
	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.
ENGLAND AND WALES—cont.																		
North Union - - -	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-
North Wales Narrow Gauge - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oldham, Ashton-under-Lyne, and Guide Bridge Junction - -	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Preston and Wyre - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhymney - - - -	1	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhymney and Great Western (Bargoed Joint) - - - -	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Ryde and Newport, and Cowes and Newport Joint - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Severn and Wye - - -	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sheffield and Midland Committee -	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-
Somerset and Dorset - - -	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-
South-Eastern - - - -	-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-
Taff Vale - - - -	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
TOTAL, ENGLAND AND WALES -	4	74	26	175	3	21	8	20	19	126	6	94	5	23	2	65	7	93
SCOTLAND.																		
Caledonian - - - -	-	2	-	15	-	3	-	2	5	10	-	3	1	2	-	5	-	3
Glasgow and Paisley Joint - -	-	14	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Glasgow and South-Western - -	-	-	1	4	-	-	-	1	-	2	-	2	-	-	-	2	-	3
Glasgow, Barrhead, and Kilmarnock -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Great North of Scotland - -	-	4	-	2	-	2	-	-	-	-	-	-	-	-	-	1	-	-
Highland - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
North British - - - -	-	-	4	29	2	4	-	8	3	15	-	8	-	3	2	5	-	12
Sutherland and Caithness - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
TOTAL, SCOTLAND -	-	20	5	50	2	9	-	11	8	27	-	13	1	6	2	13	-	21
IRELAND.																		
Ballymena and Larne - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Belfast and Northern Counties -	-	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Cork and Macroom - - -	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin, Wicklow, and Wexford -	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Great Northern of Ireland - -	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Great Southern and Western - -	-	1	-	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Midland Great Western - - -	-	-	2	1	-	1	-	-	-	1	-	-	-	-	-	-	-	-
Waterford and Limerick - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL, IRELAND -	2	4	3	6	-	1	-	-	-	2	-	1	-	-	-	-	-	1
TOTAL, UNITED KINGDOM -	6	98	34	231	5	31	3	31	27	153	6	108	6	29	4	78	7	115

Killed or Injured, &c.—continued.

From falling off engines, &c. during the travelling of trains.		By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains.		When getting on or off engines, vans, &c., during the travelling of trains.		Whilst attending to, or by the failure of, machinery, &c., of engines in steam.		Whilst working on the permanent way, sidings, &c.		Whilst attending to gates at level crossings.		Whilst walking, crossing, or standing on the line on duty.		From being caught between vehicles.		From falling or being caught between trains and platforms, walls, &c.		Whilst walking, &c., on the line on the way home or to work.		Miscellaneous.		TOTAL.	
Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1	1	5
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2
-	-	-	-	-	-	-	-	5	-	-	-	3	1	2	-	1	1	1	-	1	-	13	5
-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	1	-	-	-	2	5
11	25	8	26	8	26	5	49	60	89	5	-	70	107	27	94	15	56	32	6	1	27	317	1,196
-	2	-	4	1	1	1	-	3	8	-	-	4	4	2	2	1	1	2	1	-	4	20	72
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
-	1	-	1	1	1	-	-	1	-	-	-	-	2	-	2	-	1	1	-	-	-	4	22
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1	5	-	1	-	4	1	12	3	4	-	-	3	8	3	1	1	5	-	-	-	3	23	127
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1	8	-	8	2	6	2	12	7	12	-	-	7	14	5	5	2	7	8	1	-	7	47	250
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2
-	-	-	-	-	1	-	-	1	-	-	-	2	-	2	1	-	1	-	-	-	-	6	5
-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	-	-	1	-	-	-	-	3	6
-	-	-	-	-	-	-	-	3	1	-	-	-	-	-	1	-	1	-	-	-	-	5	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-
-	-	-	-	-	1	-	-	6	1	-	-	4	1	3	2	-	3	1	-	-	-	19	23
12	33	8	34	10	33	7	61	73	102	8	-	81	122	35	101	17	66	36	7	1	34	383	1,469

TABLE No. 6.

TABLE showing the different OCCUPATIONS of SERVANTS of RAILWAY COMPANIES and CONTRACTORS who were KILLED and INJURED during the Nine Months ending 30th September 1878, and classifying their INJURIES as far as practicable.

CLASS OF SERVICE.	Fatal.	Amputations.			Fractures.		Dis-locations.	Crushes.			Scalds.	Sprains, Cuts, or Bruises.	Severe.	Shaken.	Slight.	Unspecified Injuries to				Miscellaneous.	Total Injured.
		Legs or Arms.	Feet or Hands.	Toes or Fingers.	Legs or Arms.	Collar-bones or Ribs.		Legs or Arms.	Feet or Hands.	Body.						Head.	Body.	Legs or Arms.	Feet or Hands.		
Breaksmen and Goods-guards	28	8	2	6	11	4	2	14	38	19	-	84	2	10	25	6	17	17	21	1	287
Capstanmen -	1	-	-	-	-	-	-	-	2	-	-	2	-	-	1	-	-	1	1	-	7
Carmen -	1	1	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	3
Carriage-cleaners	6	-	-	1	-	2	-	-	3	3	-	3	1	1	1	-	1	1	-	-	17
Carriage or Waggon examiners	3	1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	1	-	-	4
Checkers -	1	-	-	-	-	2	-	-	2	1	-	1	-	-	-	-	-	-	-	-	6
Chockers, Chain-boys, and Slip-pers -	3	-	-	1	-	-	-	2	5	-	-	6	-	-	2	-	-	2	2	-	20
Clerks -	6	1	-	-	1	-	-	-	1	-	-	1	-	-	-	-	1	-	-	-	5
Engine-cleaners	10	-	1	-	1	-	-	1	7	1	-	1	1	-	1	-	2	1	1	1	19
Engine-drivers -	14	1	3	1	4	-	1	2	4	1	8	23	13	6	8	4	2	6	4	2	93
Firemen -	19	2	3	1	3	3	-	3	8	5	8	31	13	7	21	11	3	4	9	2	137
Gatekeepers -	7	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	2
Greasers -	4	-	-	1	-	-	-	-	2	2	-	-	1	-	-	-	-	-	-	-	6
Guards, Passenger -	4	-	-	-	4	-	-	-	1	4	-	16	6	11	6	5	1	3	-	-	57
Horse-drivers -	12	-	-	1	3	1	1	-	7	8	-	6	3	2	1	-	1	3	3	1	41
Inspectors -	5	-	-	-	-	1	-	-	3	1	-	3	1	2	3	-	1	-	-	-	15
Labourers -	27	2	-	-	2	-	-	1	4	2	-	13	1	6	9	2	2	3	-	1	48
Lampmen -	3	-	1	-	-	-	-	-	1	1	-	2	-	-	-	2	1	1	1	1	11
Loaders and Sheeters -	2	-	-	-	-	1	-	-	1	2	-	1	-	1	-	-	-	-	1	-	7
Mechanics -	16	-	-	-	4	-	-	1	-	1	-	6	1	-	1	1	3	2	-	-	20
Messengers -	-	-	-	-	-	1	-	1	1	1	-	1	-	-	-	1	-	-	-	-	6
Number-takers -	2	-	-	2	1	-	-	-	2	3	-	-	1	-	1	-	-	1	1	-	12
Permanent-way Men -	94	5	-	2	8	3	-	6	9	4	-	29	13	9	14	11	5	12	2	-	132
Pointsmen -	11	-	-	-	2	-	1	1	5	-	-	5	-	3	2	-	2	1	-	-	22
Policemen -	-	-	-	-	-	-	-	1	-	-	-	1	-	-	1	-	-	-	-	-	3
Porters -	41	4	2	2	12	6	2	8	36	23	-	70	17	12	25	7	6	18	15	1	266
Shunters -	33	2	1	-	7	3	1	6	24	8	-	28	10	4	18	6	3	11	14	1	147
Signal-fitters -	2	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	2
Signalmen -	6	-	-	-	-	1	-	1	1	-	-	8	1	-	-	1	-	1	1	-	15
Station Masters	1	-	-	-	-	-	-	1	-	-	-	1	-	-	1	-	-	-	1	-	4
Ticket-collectors	1	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	1	-	4
Watchmen -	4	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	2
Yardsmen -	4	2	-	1	2	-	1	1	3	-	-	6	1	-	-	1	-	-	1	-	19
Miscellaneous -	4	1	-	-	-	1	-	-	-	-	-	2	1	1	1	-	-	2	1	-	10
Contractors' Servants.	8	-	-	-	3	-	-	1	1	3	-	4	2	1	2	1	1	1	-	-	20
TOTAL	383	31	13	19	69	29	9	51	171	93	16	360	91	76	144	59	53	93	81	11	1,469

TABLE No. 7.

NUMBER of PERSONS reported during the Nine Months ending 30th September 1878, as having been KILLED or INJURED, whilst upon the Companies' Premises, by Accidents in which the Movement of Vehicles used exclusively upon Railways was not concerned, distinguishing between Passengers, Servants of Companies, and other Persons, and classifying, as far as practicable, the Nature and Causes of the Accidents occasioning the Death or Injury.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
Whilst ascending or descending steps at stations - - - -	2	60	—	—	—	—	2	60
By being struck by barrows, by falling over packages, &c. on station platforms -	—	19	—	—	—	—	—	19
From falling off platforms - - -	1	19	—	—	—	—	1	19
By other accidents - - - -	—	30	—	—	—	—	—	30
TOTAL - - - -	3	128	—	—	—	—	3	128
SERVANTS :—								
Whilst loading, unloading, or sheeting waggons - - - -	3	276	—	16	—	2	3	294
Whilst moving or carrying goods in warehouses, &c. - - - -	—	92	—	—	—	—	—	92
Whilst working at cranes or capstans -	3	65	—	2	—	—	3	67
By the falling of waggon-doors, lamps, bales of goods, &c. - - - -	3	91	—	7	—	1	3	99
From falling off, or when getting on or off, stationary engines or vehicles -	1	215	1	22	—	2	2	239
From falling off platforms, ladders, scaffolds, &c. - - - -	6	84	—	4	—	—	6	88
By stumbling whilst walking on the line or platforms - - - -	—	93	—	2	—	1	—	96
Whilst attending to stationary engines in sheds - - - -	1	34	—	1	—	—	1	35
By being trampled on or kicked by horses	2	36	1	—	—	—	3	36
Whilst working on the line or in sidings	6	123	1	5	—	—	7	128
Miscellaneous - - - -	3	94	—	6	—	—	3	100
TOTAL - - - -	28	1,203	3	65	—	6	31	1,274
PERSONS ON BUSINESS AT STATIONS -	8	51	4	4	—	1	12	56
SUMMARY :—								
Passengers - - - -	3	128	—	—	—	—	3	128
Servants - - - -	28	1,203	3	65	—	6	31	1,274
Persons on business at stations - -	8	51	4	4	—	1	12	56
TOTAL ALL CLASSES -	39	1,382	7	69	—	7	46	1,458

Board of Trade, December 1878.

T. H. FARRER.

REPORTS TO THE BOARD OF TRADE UPON ACCIDENTS INQUIRED INTO BY THE INSPECTING OFFICERS OF THE RAILWAY DEPARTMENT.

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BELFAST AND COUNTY DOWN RAILWAY.

Board of Trade, (Railway Department,)

24th August 1878.

SIR,

IN compliance with the instructions contained in your Minute of the 19th instant, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the accident that occurred on the 13th instant at Ballymacarrett junction on the Belfast and County Down Railway.

The engine, guard's break-van, and four passenger coaches of the 7.15 a.m. train from Downpatrick to Belfast got off the rails when passing through the facing-points at the junction. No persons were hurt.

The train consisted of a tank engine, a break-van with a guard, seven passenger coaches, and another break-van with a guard at the tail of the train. The train was stopped before the last three vehicles reached the points, and they did not leave the rails. The train was travelling at a speed of five or six miles an hour when the accident occurred.

Ballymacarrett junction is about half a mile from the County Down Belfast Railway station. The railway to Holywood and Bangor and the Belfast Central Railway join the Belfast and County Down Railway at this place, but the accident occurred just beyond the junction of these railways, where the County Down single line becomes a double line previous to being joined by the two other railways.

The junction is protected by the ordinary home and distant signals. They are interlocked with the points, and are worked from a raised cabin, which is 62 yards from the points where the accident occurred.

Since the accident these points have been fitted with a lifting bar, which prevents their being moved while a train is passing over them, but there is no bolt to secure the points being placed close home to the stock rail before the signals are lowered, and the facing-points are so far from the signal cabin that the man on duty cannot see whether they are close home to the stock rail or not. These points and the permanent way adjacent to them had been renewed just previous to the accident.

The evidence is as follows :—

Richard Kirkham, engine-driver of 7.15 a.m. from Downpatrick on the 13th August.—I left at the proper time, and arrived at Ballymacarrett about 8.36 a.m., due at Belfast 8.40 a.m. Ballymacarrett is about half a mile from Belfast. The signals were all right at Ballymacarrett junction. I approached it at about five or six miles an hour. It is a falling gradient of about 1 in 120. Just before my engine reached the junction points, the travelling inspector, who was on the engine, called my attention to the switches not being right (the home-signal was at "all right at the time"). I blew the whistle, reversed my engine, put on steam, and my fireman applied the break, which fits on four wheels, and I brought my engine and train to a stand about 50 yards beyond the facing-points. My engine, leading guard's van, and, I think, four coaches got off the rails just after passing the points. Three coaches and the guard's van at the tail of the train remained on the rails: they were at the Downpatrick side of the points. When I went back to look at the points after the accident, they appeared to be almost right; the switch at north side was half to three-quarters of an inch open, and had the edge cut or broken off. My engine was a tank-engine and was running with the funnel in front. None of the vehicles turned over, and no one was hurt. I have been an engine-driver with County Down 16 years. New points were put in a few days before the accident, and the lifting bar had not been put in. I saw no one near the points when the accident occurred. I did not notice that the switches or connecting rods between them were bent.

I went on duty on the 13th August about 6 a.m. The first train was the 2.30 a.m. goods from Newcastle to Belfast, which passed my cabin about 6.30 a.m. The next train was the 7 a.m. from Belfast to Newcastle, which passed about 7.4 a.m. The next train was the 7.15 a.m. from Downpatrick, which arrived at my cabin about 8.37 a.m. I lowered my signals for this train to "all right," but the train got off the rails as it reached the junction facing-points. I had been to the points after the down train passed; they were not quite close at the north side, but so little open that I cannot show the amount. They had been in the same state since they were put in. Ferguson had been looking at them on the Saturday previous to the accident. I cannot pull the up-signal lever until the point lever is quite home in its notch. Nothing has been done to the locking-gear of these points since the accident. I cannot pull the down home-signal off until the point lever is in its proper place in the notch. I lowered my up and down signals for the several trains that passed. The point at north side was quite close home to the stock-rail when I looked at it after the accident, before any of the coaches had been moved and before I moved the levers. I did not go to look at the points till after the Holywood train passed, about 15 minutes after the accident. I have been signalman at Ballymacarrett about a year. I did not lower the distant-signal for the 8.40 a.m. train from Donaghadee. As the junction was foul I could not work the signal. I am sure the 7 a.m. train from Belfast did not run through the points when they were set the wrong way. When I went on duty I examined the points. The signalman whom I was

William Sundy, signalman at Ballymacarrett junction.

relieving pulled the levers while I looked at the points, and they worked all right.

Edward Ward, permanent-way inspector from Belfast to Donaghadee and Saintfield, about 30 miles.—I saw the Ballymacarrett points on Sunday evening and Monday morning previous to the accident. I saw them worked, and they were working well. I was on the engine of the train that met with the accident, and I noticed the switch at the north-side of the Ballymacarrett facing-points about 1 inch to $1\frac{1}{2}$ inches from the stock-rail when the engine I was on was about fifty yards from the points, and was running about five to six miles an hour. Steam was shut off at the time and the junction signals were all right. I called the driver's attention to the defective position of the points, and dropped off the engine just as she was stopping. The driver whistled when I called his attention. The break was already applied to the engine. The whole of the train did not pass the points, and when the train came to a stand I went to the signal cabin, called to the man on duty from the railway, that the points were wrong. He said they were not, and I went to the points. The switch at the south side was bent, and there was a wheel between the switch and the stock rail at the north side; this wheel was about half-way up the switch rail. No part of the train had been moved at this time. I called the driver's attention to this, and he appeared to agree with me, that the train had gone wrong at the points. I think there was two inches between the point of the switch and the stock rail at this time. I did not go into the signal cabin or observe the state of the point lever. I am sure the up home-signal was lowered to "all right" when the accident happened. The centre connecting rod between the switches was bent. Several rails of the permanent-way were bent, and some chairs broken. The three chairs next the joint at the heel of the switch at the south side were broken. The part of the train that left the rails got off between the up and down lines, where the single line becomes a double line, a little to the east of Ballymacarrett junction. I have been about four months permanent-way inspector. I was a ganger at the Belfast end of the line for about three years, and five years altogether ganger, and 14 years in the company's service. Ferguson, the signal fitter, was at these facing-points on Saturday and Monday previous to the accident. The points were working perfectly on Monday, and not one of the three signalmen made any complaint of them. I noticed the Ballymacarrett points when I passed on the down train previous to the accident, and they were set right for the train.

From the foregoing evidence it would appear that the work connected with the renewal of the facing-points and permanent way adjacent to the points had not been completed when the accident happened. The lifting bar had not been fixed, and the signalman on duty in the junction cabin had been directed to look at the points after each train passed, to see that they moved properly, and closed home to the stock rail. Signalman William Sundy stated that he set them for the 7.15 a.m. up train after the 7 a.m. down train passed, and that he then went and examined them. If he did, he must have done so in a very careless and insufficient manner, or he would have seen what the permanent-way inspector, who was travelling on the engine of the 7.15 up train, did, viz., that the switch at the north side was about $1\frac{1}{2}$ in. from the stock rail instead of being close home to it.

When I examined these points I found the stock rails about $\frac{3}{8}$ ths wide to gauge. It was probably this, and the fresh packing (which was done after the renewals) having sunk slightly under the outer rail of the curve, that caused the switch at the north side to open sufficiently to allow the flanges of the off wheels of the engine and four leading coaches to get between the switch and the stock rail, and thus leave the rails. The train was stopped about 50 yards beyond the points.

I recommend that the stock rails be tied to gauge with iron cross-ties, and that all the points at Ballymacarrett junction be fitted with Saxby and Farmer's locking

John Owens, signalman at Ballymacarrett.—On the 13th I was relieved at 6 a.m. Sundy arrived about 6 a.m., and examined the points while I pulled them over, and I left shortly after 6. Sundy made no remarks about the points being amiss, and I am certain they were right when I left. I worked them Friday, Saturday, and Sunday night, till Monday morning, and found nothing wrong. The point at left side going from Belfast was slightly slack if the lever was not pushed hard over, but nothing that I could remark wrong. The stock rail was right and tight. I have been signalman since 1874. This part of railway near the points had just been renewed. The ballast was filled in. Neither of the other signalmen said anything to me about the state of the points, nor did I say anything to the permanent-way men. I never saw anything wrong, nor did I tell Sundy at any time nor did Sundy tell me that the points were not safe. I never saw them so that I could put the pencil in between the switch and the stock rail. It was merely that they did not fit tight if the lever was not put sharp over.

Wm. Bennett, guard of 7.30 a.m. from Donaghadee on the 13th August.—It is the front portion of the train due at Belfast at 8.40 a.m. I was riding in break-van next the engine. The home-signal at Ballymacarrett junction was at "all right" when I reached it. We were running from five to six miles an hour at the time. My break was on. I put it on about three-quarters of a mile from the junction. My train consisted of seven coaches and a break-van front and rear. My van and four coaches next to it got off the rails at the junction points; the other vehicles remained on, and had not reached the points. I did not notice the points after the accident. I have been between four and five years a guard. I did not speak to anyone or go to the signal hut. I put my break on when the driver whistled about the ordinary place. I did not hear the driver whistle when he reached the junction.

John Rice, front guard of 7 a.m. train from Belfast to Newcastle, 13th August.—I did not observe the Ballymacarrett junction signals when I passed that morning. I was sorting my parcels.

James Conway.—I was hind guard of 7 a.m. train, Belfast to Donaghadee, on the 13th August. As I was approaching the junction I observed that the signals were "all right."

bolts and lifting bars, as the lifting bars now fitted to the facing-points at this junction are very unsatisfactory and do not secure safety.

The lifting bars should be as long as the greatest distance between the centres of the wheels of any of the carriages.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. H. RICH,
Colonel, R.E.

Printed copies of the above report were sent to the Company on the 7th September.

BISHOP'S CASTLE RAILWAY.

SIR,
Board of Trade, (Railway Department,) 13, Downing Street, London, S.W., 20th September 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 28th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 23rd ultimo, near Craven Arms, on the Bishop's Castle Railway.

In this case, as the 11.8 a.m. mixed passenger and goods train—consisting of engine and tender, two loaded waggons of lime, two loaded waggons of coal, a third-class carriage, a composite carriage, a guard's van, a third-class carriage, and a horse-box, nine vehicles in all—was running round a curve of 20 chains radius, shortly after passing the junction with the Shrewsbury and Hereford main line, at a speed stated not to have exceeded eight or nine miles an hour, the third waggon from the engine left the rails followed by the remaining six vehicles. The train was stopped in about 50 yards, no couplings having given way, and the greatest distance of any wheel from the rails not having exceeded 7 or 8 inches.

No passengers complained of injury.

The only damage to rolling stock was to the break-gearing of the guard's van.

In the permanent way 12 sleepers and 70 chairs had to be replaced.

Description.

The Bishop's Castle Railway is a single line, nearly 10 miles long from its junction with the Shrewsbury and Hereford line, about a mile north of Craven Arms station to Bishop's Castle. It was opened in the year 1866, and as the original scheme according to which the line was to have been extended to join the Cambrian line at Montgomery, has never been carried out, the undertaking has been more or less a failure, and has been for some years in Chancery, the funds being administered by a receiver.

In consequence of this state of things there has been a great difficulty in getting money for the proper maintenance of the line, and it is now generally in a bad state of repair.

The permanent way consists of double-headed wrought-iron rails in 18, 21, and 24 ft. lengths, which weighed 75 lbs. to the yard, fished at the joints; the chairs are of cast iron, weighing 28 lbs. each, the rails being secured in the chairs by outside wooden keys, and the chairs to the sleepers by two iron spikes in each; the sleepers were originally of half round Memel timber, 9 feet long by 10 inches by 5 inches, placed at an average distance of 3 feet from centre to centre, but these have in some instances been replaced by rectangular sleepers. The curve in which the accident occurred has a radius of 20 chains, the outer rail being on the east and the line level.

The first mark visible of a wheel being off the rails was on the inside of the third chair from the joint of an inside rail 64 yards north of the junction loop joints, the five succeeding chairs being similarly marked; and there was, I was informed, a mark of a wheel flange, corresponding with these marks on the chairs, on the top of the opposite outside rail; the next inside rail was turned over and all the chairs broken; in the opposite outside rail all the chairs were broken; the next inside and outside rails were both turned over; after which there was more or less disturbance of the road until the train came to rest after the third vehicle had run about 50 yards off the rails. When I examined the line I found no less than 28 sleepers more or less decayed in the 11 lengths of rail next north of the spot where the first mark was visible; and adding to this number the 12 sleepers which had been replaced directly after the accident, makes no less than 40 decayed sleepers in 11 lengths of rails, or about one half the whole number. In addition to this, judging from the condition

of the rest of the line, there were doubtless many keys either rotten or deficient, and one or two fish-bolts absent from each fish plate. The cant of the outer rail of the curve is now about 3 inches, and the gauge where the road has been repaired $\frac{1}{4}$ of an inch tight, though nearer the junction it varies from $\frac{3}{8}$ to $\frac{3}{4}$ of an inch slack.

Evidence.

1. *John Broome*, guard about 14 months on the Bishop's Castle railway, previously signalman at Craven Arms in the joint company's service.—I started with the 11.8 a.m. train for Bishop's Castle on the 23rd; it was seven minutes late in starting. The train consisted of engine and tender, two loaded lime trucks, a Cannock Chase Company's loaded coal waggon, a West Cannock Company's loaded coal truck, a third-class, a composite, a guard's van, a third-class, and horse-box, nine vehicles in all. The yardsman at Craven Arms was with me in the van. We did not stop anywhere before the accident, and nothing attracted my attention till I saw, as I was looking out on the left side, some coal fall off the third waggon from the engine, the speed being at the time not more than eight miles an hour. I thought something was wrong and at once put on my break, and just as I got it on my van left the rails. We did not run more than 50 yards off the rails before we stopped, when I found that all seven vehicles at the rear of the train were off the rails, over the right rails, but still in good line and all coupled together. Traffic was resumed at about 4 o'clock. No one complained of being hurt. The break gearing of the break-van was the only damage to rolling stock. I cannot form an idea as to the reason of the train leaving the rails.

2. *Thomas Bird*, driver 12 months on the Bishop's Castle line; fireman and cleaner on the line for nine years previously.—The engine I was driving the day of the accident is a six-wheeled engine, four-coupled, and four-wheeled tender. I was running engine first, and had on a train of nine vehicles. We were a few minutes late in starting, waiting for the London and North-western down train. After starting we had a clear run past the junction, but just after passing the loop, when running at a speed of eight or nine miles an hour, I felt the engine jerk. I looked back at once

and saw the third waggon from the engine off the rails. I shut off steam, reversed my engine, but owing to the rails being greasy, did not stop as soon as we might. The fireman put his break on. We gradually stopped after running a short distance, and on going back I found the seven vehicles at the back of the train off the rails. No couplings had given way. No vehicle would be more than seven or eight inches from the rails. The pair of wheels of the two coal waggons was inside the rails. I can form no idea of why the accident happened. I have never run off the rails before. We are allowed 45 minutes for running the ten miles. I never intend to exceed 15 miles an hour. I had a caution from the Manager when I first became driver, not to run fast.

3. *Thomas Wright*, foreman ganger of platelayers since the line opened.—I have no one over me but Mr. Craston, the traffic manager. I have six men under me, all platelayers; as a rule we work together. The line is always walked over either once or twice a day. When the accident occurred I was at Lydham Heath and reached the spot as soon as I could, between 12 and 1. Nothing had been done to the road when I got there, and I found the state of things as I explained it yesterday. I had passed the spot at about 7.0 a.m. and it was all right then. The night had been very wet. I had to replace about 12 sleepers, 70 chairs, but no rails to renew. The cant of the curve is about 3 inches. I had 1,000 sleepers in July 1877, and these have all been put in, and I am now waiting for a further supply of 500. I got 1,000 keys supplied in June; I have not received all the keys and fish-bolts I have asked for, but am expecting more daily. We have not enough men to keep the road in proper order, there ought to be at least three gangs of three men each.

Conclusion.

I have no doubt that this accident was caused by the spreading of the rails as the heavily loaded waggons forming part of the train were passing round the curve on the morning in question; the decayed state of many of the sleepers, and the probable absence or rottenness of many of the wedges being quite sufficient to allow of such spreading taking place.

I was unable to examine the waggon which was first to leave the rails as it had been sent away some days before I was able to make the enquiry; I was informed that its wheels were examined and found correct to gauge, but that the top plate of one of the springs was broken, the fracture appearing to be a fresh one, and probably a consequence of the accident.

As the general state of the Bishop's Castle Railway will form the subject of a separate report I need here make no further allusion to it.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major General R.E.

Printed copies of the above report were sent to the Company on the 4th October.

CALEDONIAN RAILWAY.

SIR,
Board of Trade, (Railway Department,) 13, Downing Street, London, S.W., 4th July 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 29th ultimo, the result

of my inquiry into the causes of the accident which occurred at Buchanan Street station, Glasgow, on the Caledonian Railway, on the 27th ultimo.

In this case a Caledonian special passenger-train, from Millerstone, near Steppes Road, to Buchanan Street station, entered the station at too high a rate of speed, and came into collision with the buffer-stops at the end of No. 1 arrival line.

The train consisted of engine and tender (running tender first), front break-van, nine composite carriages, and one third-class carriage with break compartment in rear.

The passengers, about 400 in number, were principally boys from an institution at Millerstone. It is stated that twelve of these boys and the matron of the school were injured.

The only damage to the rolling-stock was the breaking of three buffer-castings on the tender.

The buffer-stops were broken.

Description.

The line on approaching Buchanan Street station from the east falls towards the station for upwards of $2\frac{1}{2}$ miles on the following gradients, viz.: For 44 chains at 1 in 125; for 1 mile 2 chains at 1 in 100, and for 1 mile 24 chains at 1 in 79, while for the last 20 chains up to the buffer-stops it is level.

There is a tunnel a quarter of a mile in length, the west end of which is 800 yards from the buffer-stops, and the line, which through the tunnel is double, branches into seven lines before entering the station.

The platform of No. 1 line is 470 feet in length.

The ticket platform, at which all ordinary trains stop, is 550 feet in length, the west end being 1,300 feet from the buffer-stops, and the engine sidings are opposite to this platform.

The station is protected by the usual signals worked from the Buchanan Street box.

Millerstone, whence the train started, is 3 miles 3 chains distant from the buffer-stops.

The engine, No. 311, is a single coupled tender engine with 7-foot driving wheel, and a 4-wheeled tender with one break-block to each wheel. The weight of engine and tender is 47 tons.

The front break was one of the new West Coast Joint Stock vans, weighing 11 tons, with six wheels, and break-blocks on both sides of leading and trailing wheels.

The rear break-van was an ordinary third-class carriage with break compartment, weighing eight tons.

The total weight of the train may be estimated at 164 tons.

Evidence.

James McCotter, relief-guard two years, states: On the 27th June 1878 I took charge of a special train, consisting of engine and tender, front break-van, nine composite carriages, and third-class break-carriage in rear, from Glasgow to Steppes Road. All the carriages were empty. I was in the rear van. We arrived at Steppes Road at 7.20 a.m., and left again for Glasgow at 7.28 a.m. At Millerstone we took in about 400 passengers, almost all boys from an Industrial School, and started again at 7.38 a.m. We found all signals clear for running into Buchanan Street station. We entered the tunnel at our usual speed. Steam was off, having been shut off about a mile further back. My break was put on at the entrance of the tunnel, and remained on until we struck the buffers. The driver was whistling for the breaks as we came out of the tunnel, and was then, I think, running faster than when we entered it. When my van came out of the tunnel I was looking out of the window, and an engine standing in the goods yard whistled "break" at me. I at once tried my break but could not tighten it. The wheels were not skidding. The break was in good order. I should think we must have been running 20 miles an hour at the time. A second engine whistled "break" at me, but I heard nothing from the engine of my train after leaving the tunnel. I knew we were running in too fast. We came into collision with the buffer-stops on No. 1 line. The engine was running tender first. The buffer-stops were broken. Three buffer-castings were broken on the tender. There was no other damage to the carriages. I felt

a considerable shock, but was not knocked down, as I was holding on. About 12 of the boys were hurt, principally cut about the head, as they had been looking out of the windows, and one woman. It was a bright morning, and the rails were dry. Both driver and fireman were perfectly sober. The speed seemed to me to begin to reduce rapidly about the ticket platform.

Thomas Tinning, relief guard 3½ years, states: I was riding in the front break-van of the special train on the morning of the 27th ultimo. It was a 11-ton six-wheel break-van, with break-blocks on both sides of leading and trailing wheels,—one of the West Coast Joint Stock vans. I first perceived that our speed was too great as my van, which was next to the engine, came out of the tunnel. It was then that the driver first whistled for the breaks. My break had been put on about 200 yards before entering the tunnel, and I tried to tighten it up when I heard the whistle. I could not get it on any harder. The wheels were not skidding. We must have been going about 20 miles an hour at the time. The driver whistled several times after leaving the tunnel. I should think we may have been going from eight to ten miles an hour as we ran into the dock. I could easily have got into my carriage if I had been on the platform. I was not knocked down by the collision. I had spoken to the driver at Steppes Road, and he was sober. I think we may have been running about 25 miles an hour at Sight Hill, the head of the incline about $1\frac{1}{2}$ mile from the station. I did not think that

the driver was checking his speed sufficiently at that point as usual, and therefore I put on my break. I am certain I turned my break wheel the right way: I could feel the blocks rubbing hard.

Mr. John Gibson, assistant station-master, Buchanan Street station, states: I was in charge of the station on the morning of the 27th ultimo. At about 7.45 a.m. a special train from Steppes Road ran into No. 1 line. I saw it coming in too fast, I should think 10 or 12 miles an hour as it came to the end of the platform. It was reducing speed very fast, and perhaps was going from 5 to 6 miles an hour when it struck the buffer-stops. The buffer-stops were knocked back. The passengers, principally boys, had their heads out of the windows, and a good many were hurt slightly. The only breaks I noticed were the tender breaks, which were hard on. The engine was reversed, but I cannot say if any steam was coming out of the funnel. I thought the train would have stopped in time, as as it was pulling up so quickly. It would certainly have stopped in 20 yards, more or less.

David Wilson, pilot driver 14 years, states: On the 27th ultimo I was sent with a special train of empties to Steppes Road. My engine, 311, is a single-coupled tender engine with seven-feet driving wheel, and four-wheeled tender. It has four wooden break-blocks to the four tender wheels worked by one wheel. I got round the train at Steppes Road, and stopped at Millerstone, opposite the institution, to pick up the boys. We took in nearly 400. The signals were right all the way for us. It is downhill all the way, and I shut off steam before coming to Milton junction, in fact very soon after starting, and the breaks were rubbing all the way. We were coming all right about our usual speed until we were in the tunnel. I then noticed we were running too fast, and my mate put on the tender breaks hard, but it didn't seem to check our speed much. I didn't whistle for the guards' breaks until near to the west end of the tunnel. We must have been running 20 miles an hour on coming out of the tunnel, which is faster than it should be. A train that is going to run in past the ticket platform should not be running more than seven or eight miles an hour at that place. I whistled several times after leaving the tunnel, and finding that we were not pulling up, I reversed opposite to the ticket

platform, and put reverse steam on. I then opened my sand-boxes, but as we were going tender first, the tender wheels got no benefit. We didn't begin to pull up much till at the ticket platform, but when I entered the dock we had reduced to five or six miles an hour, and when we struck the buffer-stops to about four miles an hour. Both the fireman and I stepped off before striking and did not fall down. I don't think the guards' breaks were put on properly. I didn't examine them after the collision.

John Wyld, fireman eight months, states: The driver's evidence is correct, but I should say the speed on leaving the tunnel was 25 miles an hour, and on entering the dock about eight miles an hour,—as fast as I could run, I should say. I don't think the speed reduced much until the ticket platform. I didn't look at the guards' breaks after stopping. The tender wheels were skidding all the way from 200 yards on the other side of the tunnel.

Robert Reid, signal inspector, states: After the accident I examined the books of the signalman at the east end of the tunnel. The special was billed as passing Millton junction at 7.42, and it passed the east end cabin at 7.45. The usual time table for trains is about four minutes. The signalman told me that he didn't think the train running at an excessive speed. He could not say anything about the breaks, nor could the signalman at the west end, who says he thought it was the limited mail coming out, which, having continuous breaks, always comes faster. The man at the Buchanan Street cabin knew nothing about the breaks, but a carriage examiner told me that the break-blocks on the rear break were tight on after the accident, but that he didn't look at the front break.

Edmund Haggart, locomotive foreman, states: I saw the special train running past the engine shed near the east end of the ticket platform. It was running too fast. I saw the driver reverse his engine at this point. The tender breaks were hard on as he came out of the tunnel mouth. I saw the fire flying from the rails. I didn't see whether the breaks in the front van were on hard or not, but they didn't seem to be doing much good. I am certain that the breaks in the rear van were not on at all. Soon after it passed me I saw the train pulling up very fast.

Conclusion.

This accident was due principally to the fault of the engine-driver of the special train, in not getting his train under proper control on approaching Buchanan Street station.

It is probable that the speed of the train was greater than usual before entering the tunnel, for it appears that it took one minute less than the usual time in running from Millerstone to the cabin at the east end of the tunnel, a distance of about $1\frac{1}{4}$ miles, the whole distance of 3 miles 30 chains from Millerstone to the buffer-stops being run in eight minutes, or at an average speed of about 25 miles an hour, which is too high a rate at which to approach a terminal station on an incline with only ordinary breaks.

The driver urges that the guards' breaks were not properly applied; but, however this may be, he did not make use of all the means of stopping the train in his own control, for he admits that he did not reverse his engine until he arrived at the ticket platform, more than 200 yards after leaving the tunnel, and that, although he discovered that his speed was too great soon after entering the tunnel, he did not whistle for the guards' breaks until shortly before leaving it.

With regard to the guards' breaks the evidence is conflicting, but there are strong reasons for believing that the rear guard is to blame for not having applied his break properly, the evidence of the locomotive foreman, who watched the train passing, being very positive on this point.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on the 30th July.

CALEDONIAN RAILWAY.

Board of Trade, (Railway Department),
31st August 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the order of the 3rd instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 24th ultimo, at Larbert station on the Caledonian Railway.

In this case while the 7.35 a.m. down passenger train from Grangemouth for Larbert and South Alloa was standing at Larbert station, it was run into by a light engine which was returning along the down line to the station, after having taken a horse-box from the sidings at the north end of the station to a siding at the south end of it.

Two passengers were injured.

In the passenger train the buffer shell of the break-van next the engine was broken. The light engine was not damaged.

Description.

There are signal cabins at both the north and south ends of Larbert station, in which the point and signal levers are concentrated and interlocked. As regards the present collision the only signal that need be alluded to is the down starting signal at the north end of the station. This can be seen from the line opposite the south cabin, from which position a train standing on the down line at the station can also be seen, and continues in sight until it is reached from an engine approaching it on the down line.

Block working is not in force between the north and south cabins, but trains, &c. should be sent forward with a caution if there is anything in front of them.

Evidence.

1. *William Knox*, guard 8 years.—I started punctually from Grangemouth with the 7.35 a.m. train for Larbert and South Alloa. The train consisted of an engine and tender, break-van, composite (1st and 2nd), and 3rd class break-carriage in rear. I was in the rear break-carriage. We arrived at Larbert punctually at 7.52, and had been standing nearly two minutes and were just about to start, when a light engine ran into the rear break-carriage. I saw it coming about 30 yards before it struck, as I was coming out of the booking office where I had been to fetch a bundle of papers. Its speed was three or four miles an hour, and I saw a person standing by the break handle next the platform. He was looking forward but could hardly see the train for the coals on the tender which was in front of the engine. I gave him a hand signal to stop, and shouted, and he then put on the break, but he could not stop, and struck the rear carriage at a somewhat slower speed. My break was off. The train was moved forward about two carriage lengths. The persons injured were in the front compartment of the break-carriage. I did not see more than one person on the engine, but there might have been two. I did not ask the man how he had come to run into us. We went on as we were after a detention of about three minutes. I saw no one further south than myself when I came out of the booking office. I heard no whistle from the engine as it came up. I had no time to signal to my driver to move ahead.

2. *George McCall*, driver 10½ years.—I was in charge of engine No. 431, standing in the up siding north of the station, attached to a stone train, and waiting for some waggons off the 5.30 a.m. train from Perth, before proceeding to Edinburgh. I was back in the guard's van taking my breakfast while the fireman was cleaning his engine. As far as I can remember I had given the fireman Miller no instructions before leaving him: he was aware I was going back to get my breakfast. After I had been away from half

to three quarters of an hour, I missed the engine and came to look for it, and met it north of the platform after the collision had occurred. I asked the fireman why he had gone away without informing me, and he said the yardman had asked him to move a horse-box from the north to the south end of the station: and he thought there was no harm in doing what was asked him. A telegraph boy was with him on the engine. I did not think there was any harm in leaving my engine under the circumstances. Miller was not my regular fireman. I had only had him the previous day, my proper fireman being away ill.

3. *William Miller*, fireman three years, two years with the North British Company, and the last year with the Caledonian Company.—I was dismissed from the North British Company for being away a day without leave. I had been working regularly on a shunting engine at the Edinburgh (Caledonian) station, and had been attached to McCall's engine the day before the accident, in consequence of his own fireman being away ill. I had been at Larbert frequently when in the North British service. I had arrived at Larbert on the morning of the 24th from Stirling at about half past six, and was waiting in one of the up sidings at the north end of the station for the 5.30 a.m. train from Perth. I was engaged in cleaning my engine. The driver had remained with the engine for about an hour, and had then gone back to the van to take his breakfast, telling me what he was going to do. The driver had been gone about half an hour, when a yardman came to me, and said there was a horse-box to move from the down siding north of the station to the up siding on the south of it. I told him I was not acquainted with Larbert, and that he had better go for the driver. He said there was not much time, and it would not take me very long to do it. I then made no further objection, and he put a telegraph boy on the engine to mind the break. The yardman then uncoupled the engine from the train and signalled me to go.

I crossed to the down road and then into the siding, picked up the horse-box which the same yardman coupled on, I then came out on to the down road, crossed to the up road and pushed the horse-box along the up line to the siding south of the station, where I left it on the main line, a North British engine putting it back into the siding. During this time I did not observe the train from Grangemouth pass. I got across the road immediately, and proceeded towards the station tender first, standing on the 6-ft. side of the engine. The tender was full of coals. I looked ahead for the down starting signal, and as I was coming through the bridge saw it clear, and thinking it was for me, went on and saw nothing of the Grangemouth train till I heard some one whistling, when I was 10 to 12 yards from it. The steam was off and I got the engine reversed, and struck the train at a speed of seven or eight miles an hour. I did not jump off. The telegraph boy who was on the platform side of the engine was also looking out, but said nothing about seeing the train. He got the break on on hearing the whistle. He did not jump off. We were neither of us hurt. The morning was not thick. I saw that the telegraph boy understood how to work the break, the first time he used it. I am aware that I ought not to have allowed any one on the engine. The signalman said nothing to me as I crossed at the south cabin.

4. *James Pitkeathly*.—I am telegraph boy in the north cabin at Larbert. I am 16 years old, and seeing that there was no one on the goods-engine, and the yardman having spoken to me about it, I jumped on the engine and took charge of the tender-break, the working of which I understand. I went with the engine to the south cabin, and on returning towards the station was standing on the platform side. As I was passing under the bridge I saw the signal off and told the fireman so, and did not know there was a train in front till I saw one of the ticket collectors whistling and holding up his hand. I then put on the break, but we struck as I was putting it on. We neither of us jumped off. I had not seen the Grangemouth train pass us. I know I was wrong in having gone on the engine at all.

5. *Joseph Baxter*, signalman at Larbert south-box stated :—I have been about 18 months in the service I recollect on the morning of the 24th July, engine No. 431 coming to my cabin about 7.50 a.m. with a horse-box to be put into the Edinburgh siding. After it was put into the siding, the engine crossed to the down line. I set the points for it. So far as I can recollect I cautioned the driver of that engine with a green flag to go up carefully to the station. *James Pitkeathly*, telegraph lad, was driving the engine at the time. The Grangemouth train passed my box towards Larbert while engine 431 was standing on the up line. The horse-box was pulled into the Edinburgh siding by a North British engine, after engine 431 had crossed to the down line.

William Miller, fireman of engine 431, recalled, states :—*Pitkeathly* did not drive the engine. I did so myself from the time the yardman asked me to go for the horse-box until the collision occurred. *Baxter* the signalman did not caution me with a green flag.

James Pitkeathly, being recalled, denies having worked the engine.

6. *John Allardice*, yardman, six years in the company's service, 2½ years as yardman at Greenhill, and two months at Larbert.—I asked the fireman of the 5.0. a.m. goods train Stirling to Edinburgh to take his engine from an up to a down line siding at north end of Larbert station to take a horse box to an up siding at the south end of the station. The fireman made no objection, but did what he was asked at once. I hooked the horse box to the engine, but did not go to the south end with it. One of the station porters, whose name I do not know, accompanied the engine with the horse box. *James Pitkeathly*, the telegraph clerk, was not on the engine when I first spoke to the fireman, but he was on the engine when I coupled on the box, and I asked if he was going along with the engine, and he said he was. I did not tell him to act as fireman, nor did I tell him to go at all. I know nothing about the collision, and did not see the engine again till some time after the collision, being employed at the north end of the station.

Conclusion.

This collision, in which a light engine ran into a passenger train standing at Larbert station, was due in the first instance to want of caution on the part of fireman *Miller*, he, although comparatively unacquainted with the Larbert yard, had, in the temporary absence of his driver, taken upon himself to use his engine for removing a horse-box from the north to the south end of the station, and in returning to the siding from which he had started he had not kept a proper lookout as he was approaching the platform where the train was standing, and which train was more or less visible from the point at which he had started on his return from the south end of the station. The yardman *Allardice* is also to blame for having pressed the fireman in the absence of his driver to take his engine out of the siding in which it was standing to perform an operation which involved four crossings of the main line.

Driver *McCall* appears to have been away at his breakfast longer than was necessary, and, strictly speaking, he should not have left his engine at all for such a purpose.

It seems very doubtful whether the signalman at the south cabin gave fireman *Miller* any caution, after allowing him to cross, as to the fact that the Grangemouth train was standing at the station. If he did not do so, he neglected his duty, and is to blame accordingly.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on the 26th September.

CALEDONIAN RAILWAY.

Board of Trade, (Railway Department,)

13, Downing Street, London, S.W., 26th August 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 29th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 24th ultimo, near Liff station, on the Newtyle branch of the Caledonian Railway.

In this case, as the 6.50 p.m. passenger train from Dundee to Blairgowrie, consisting of two engines and tenders, a break-van, 16 carriages, and a second break-van, was drawing up at Liff station, the couplings by which the front carriage was attached to the front van gave way, and the 16 carriages and the rear van ran back about $2\frac{1}{10}$ miles towards Dundee.

One passenger was injured in jumping from the train soon after it had begun to move back.

Description.

The Newtyle branch is a single line, with steep gradients, leaving the Perth and Dundee line at Ninewells junction, about $2\frac{1}{2}$ miles from Dundee. For the first 20 chains from the junction the Newtyle branch rises at 1 in 357, for the next 6 chains at 1 in 163, and then for three miles 12 chains at 1 in 67, Liff station being situated one mile 48 chains from the commencement of this steep gradient, or one mile 74 chains from Ninewells junction; from the junction towards Dundee the gradients are gentle. There is no loop line at Liff station, but there are sidings on the Dundee side of it, entered by facing points to trains approaching from Dundee. The traffic is worked with the assistance of the train staff and ticket, but without the block telegraph.

The runaway vehicles came to rest about 300 yards on the Dundee side of Newtyle junction.

The rear centre coupling of the front van gave way at the bend of the shackle, which opened out where it rides over the hook; there was no flaw perceptible in the metal, but its thickness at the bend had been reduced from an original circumference of $3\frac{1}{4}$ inches to one of $2\frac{7}{8}$ inches. One of the side chains gave way close to its attachment to the near side of the front end of the first carriage; on the off side the hook of one of the side chains was straightened and broken.

Evidence.

1. *William Stevenson*, station master at Liff four years. —I was on duty on the platform when the 6.50 p.m. train from Dundee West to Blairgowrie arrived at the station at about right time. The train had barely come to a stand before the couplings between the front van (next the tender) and the carriage next behind it broke. I was standing at the time near the Dundee end of the platform; on the Dundee side of me there were two vehicles. The carriages began, as usual when a train stops at the platform, to recoil a short distance, but on their continuing to do so more than usual, I looked ahead and saw that the whole of the train except the front van had parted from the engines. I called out to the rear guard who was in his van to hold on the break, which I believe had not yet been taken off. I also called out to the passengers to keep their seats. I then looked to see if there were any additional break carriages, but there were none, nor was there a spoked wheel in the whole of the train; there were plenty of sprags in the sidings, but it did not occur to me to put any of these on the rails. There are no facing points for trains going towards Dundee, but one set in the contrary direction. I leapt on to the carriage, which was now the last vehicle in the train, as it passed me at a speed of six or seven miles an hour, and rode back 600 or 700 yards, the two engines and van following very gently. At about 200 yards from the platform the fireman of the train engine almost succeeded in recoupling the van and carriage, having grasped the carriage-coupling,

but not having been able to take it off the hook, when the carriages increased their speed, and separated from the van and engines. The fireman was thrown down and pushed forward some distance, holding on to the draw-bar of the van; this obliged the engines to stop, the carriages having now got 300 or 400 yards ahead. The engines then again followed up, but did not overtake the train while in my sight. When I jumped off, the speed was about 15 miles an hour. I lost my feet, but was not much the worse. The sidechain was the only thing left at the station, and this was wanting a link. Nothing has ever broken away before since I have been station master at Liff.

2. *George Spence*, spare driver, fireman seven years. —I started with the 6.50 p.m. train from Dundee to Blairgowrie at 6.53 p.m. in charge of a pilot engine to go as far as Newtyle, owing to the train being unusually heavy on account of Blairgowrie holidays. My engine was a single one, with a four-wheeled tender, and the train consisted of eighteen vehicles in all. We went in due course to Liff and reached it at 7.5, three minutes late. We stopped cautiously, and I had been standing about a minute, when the train driver's whistling attracted my notice, and on looking back I saw the carriages moving down the incline; there had been nothing to cause a strain on the couplings that I felt. We did not run up the incline to Liff faster than usual. We then followed the carriages down, and I was aware that Coupar's fireman was trying to recouple

the train. I slightly checked my engine when the buffers came together. We then followed the runaway carriages through the junction without again overtaking them till they had stopped.

3. *John Coupar*, driver 13 years.—I was in charge of the 6.50 p.m. train on the 24th. We left Dundee at 6.53 with a train of 18 vehicles in all—including a break-van next the tender, and a break carriage at the rear of the train; there was a pilot engine in front to assist us as far as Newtyle. My engine was a four-coupled one with a four-wheeled tender. There were only the ordinary breaks on the train. Nothing unusual occurred till we reached Liff; there the train had just come quite to a stand, and the carriages were recoiling in the usual way, when the coupling between the front van and the first carriage gave way. I could see no cause for this; the train had received no sudden snatch. I told the fireman to jump down and that I would follow and see if there was any means of getting the train recoupled. He did so, and I followed and overtook the carriages a little below the platform. I then got a signal from the guard in the front van, and, on applying my break, the van and carriages separated slightly. The fireman then came back and said he had nearly fallen when he had the coupling almost ready to put on. I then followed the train close down, but was afraid to touch it again for fear of increasing its speed. On approaching the junction I whistled twice as usual, and I followed the carriages through the junction on the proper line and they soon after stopped. I then pushed the train into Dundee. I saw the hook of one of the side chains straightened.

4. *Alexander Robertson*, fireman 9½ years.—I was on the train engine the evening of the accident. All went right to Liff. We had come to a dead stand before the carriages ran back. This must have been due to the ordinary recoil of the train; there was no jerk. We immediately set back and I went on to the proper left footboard of the van, prepared to couple on with the carriage coupling. We overtook the carriages a short distance the Dundee side of the sidings, and I then knelt with one knee on a buffer of the van, and another on that of the carriage. I had got the carriage coupling off its hook and within a quarter of an inch of being over the van hook, when the engines slacked their speed, and I dropped, but held on to the drawbar hook of the van, and was pushed along with my face to the van and my heels dragging along the ballast; the speed was at that time about as fast as I could run. The engines then drew up and I was able to recover myself. I then went back to the engine, and we followed the train down, not again daring to touch it,—our highest speed not being 15 miles an hour.

5. *John Bruce*, guard nearly 7 years.—I was in charge of the 6.50 p.m. train from Dundee West to Blairgowrie. It consisted of 18 vehicles, there being a break-van in front and a 1st class break carriage (No. 332) behind, the latter weighing about three tons empty, in which latter I was alone. We left at 6.53 p.m., three minutes late, with a full train. We ran at the usual speed to Liff, which we reached at 7.6 p.m., three minutes late, and after stopping I immediately felt that the train had broken away and

was running back. My break was hard on for stopping at the station, and I had never taken it off. I at once jumped out on the left side with two hand scotches, and I put one of these in front of the rear wheel of the break carriage, and ran along with it as the wheel pushed it. I did this for about 20 yards, when the speed increasing, I jumped into the break, taking both scotches with me. The speed then gradually increased, and I felt a slight bump as the engines joined us. The highest speed did not exceed 15 miles an hour. This was close to the junction, where I went out on the left side of the van, next the main line, with a red flag. The signalman saw us coming and lowered the signals for us. The speed then gradually ran itself out, and we stopped about 300 yards from the junction, at about 7.14 p.m. I decided it would be best to return to Dundee and get another van, which we did, and resumed our journey at 7.45 p.m. I saw one passenger jump out very soon after we began to run back. I believe that more jumped out, but I did not see them. My break carriage was loaded with about 30 passengers, and a ton of luggage.

6. *John Ferrier*, ticket collector at Dundee, and occasionally acting as guard.—I had been to Blairgowrie 12 or 13 times before the present occasion. I was in the front van. I noticed nothing unusual in the speed, nor did we run into Liff very sharp, no more so than usual. Immediately after the train came to rest, I felt a slight jerk, and, on coming out of the van, saw the carriages moving back. I called to the driver and told him a coupling was broken, and I went along two carriages to see if there was another break, and not finding one, returned to my van, when I found the fireman on the van with one knee on the van buffer and one on the carriage buffer, trying to couple on. I had got on to the footboard and then the fireman lost his hold through the van and carriage separating; this was, I think, from the engines slightly slackening. On seeing the fireman's position, I signalled to the driver to stop, and he did so sufficiently to enable the fireman to recover himself. We then followed down, I remaining on the footboard of the van. The hook of the van's right coupling chain broke nearly through the centre, and one of the links of the left coupling chain of the carriage.

7. *Robert Campbell*, signalman eight years at Ninewells junction.—I gave the pilot driver of the 6.50 p.m. train the staff, as he passed the cabin on the way to Liff at 7.3. The train was going about the usual speed. Afterwards I was standing at the cabin door, looking to the west, and saw a train from Liff approaching the distant-signal. I at once thought it was a runaway, and set my points for the train to come off the branch on to the down main line, and lowered my branch home-signal. There was a train due at Ninewells from Perth at 7.23, but I had received no notice of it from Invergowrie, the next block station. The runaway passed my cabin at a speed of seven or eight miles an hour, slackening speed, at 7.16. It stopped with the tail out of my sight, there being a curve. The engines passed the cabin about 200 yards after the runaway carriages. The normal position of the facing points off the single line is right for the down main line.

Conclusion.

From the foregoing evidence it appears that this accident,—when nearly the whole of the 6.50 p.m. train from Dundee to Blairgowrie ran back about $2\frac{1}{10}$ miles, happily without encountering anything on its backward journey,—was caused by the giving way of the couplings between the front van and first carriage, just as the train had stopped at Liff, a station situated on a gradient of 1 in 67.

There was apparently no particular reason for the centre coupling giving way as it did; the shackle that broke was a little reduced by wear, but not dangerously so, and some unusual strain must have come upon it, as the carriages rebounded after the engines had stopped.

It is very unwise to run such heavy trains as the one in question on lines with gradients of the character of those on the Newtyle line. If, however, they are run, special care should be used in seeing that there is sufficient break power at the tail of the train to hold it on the worst gradient up which it has to travel. The light break carriage at the tail of the train in the present instance was quite inadequate for the purpose.

Had the train been provided with an *automatic* continuous break, no harm would have ensued on the couplings giving way.*

Single line stations on steep inclines should be provided with loops and runaway points; had these arrangements existed at Liff, the runaway carriages would at once have been arrested in their backward course.

It is most important that such stations should have telegraphic means of communication with adjacent stations, and that single lines of such a character as the Newtyle line should be worked on the block system. As it happened in the present case, the signalman at Ninewells junction saw the approaching runaways some distance off, and had time to decide what was best to be done; but it might have been otherwise, and in the absence of telegraphic information from Liff as to what had taken place, he might have lowered his signals for a train from Perth to cross the junction just as the runaways were doing so; or had the Blairgowrie train gone forward with a ticket, he might have allowed a second train to follow it with the staff; in either of which contingencies the results might have been most serious.

Fireman Robertson deserves credit for the endeavour he made, at his serious personal risk, to recouple the train after it had broken loose.

The Secretary,
(Railway Department),
Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on the 11th September.

CALEDONIAN RAILWAY (PERTH GENERAL STATION).

Board of Trade, (Railway Department),
31st August 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 3rd instant, the result of my inquiry into the collision which occurred on the 30th ultimo at Perth General Station.

In this case, as the 6.15 a.m. passenger train from Edinburgh for Aberdeen was being pushed into Perth station from the south ticket platform, it was met by the engine which was on its way to join the train and take it on to Aberdeen.

Two passengers complained of slight injury.

The only damage to rolling stock consisted in the fracture of a coupling. No vehicles left the rails.

Evidence.

1. *Alexander Stewart*, driver five years :—I was in charge of engine No. 584, and was to take the 6.15 a.m. train from Edinburgh on to Aberdeen on its arrival from the south. I had been detained at the north end of the station, and on my way to the main line had been turned into a siding by mistake. This caused me to lose a little time, and I approached the platform under the impression that the train which I had noticed opposite to the clock was waiting for me, and I did not observe that it was in motion towards the north end of the platform till I was close to the north end of the shed and within about 12 yards of the first carriage. I had been engaged in trying to turn the smoke off, which had taken away my attention from the train. On seeing it in motion, I immediately reversed my engine and had brought it to a stand, but had not got into forward motion before the train struck me; it was coming at a speed of about three or four miles an hour. The engine at once went forward without being damaged. My fireman was alone with

me on the engine. The driver of a Highland train, standing nearly opposite to where I was, shouted. My fireman got his break on before we were struck. I had no business to come back without a signal from the pointsman, which signal I had not received.

2. *George Geddes*, porter in the general station, Perth :—I was standing at the north end of the station while the 6.15 a.m. train from Edinburgh was coming in, and I observed an engine coming from the north end of the station to join the train. I thought it was coming back a little fast. I did nothing myself to stop the engine, but I heard somebody shout. I was a good deal agitated myself. A Caledonian third-class carriage met the engine. I don't know whether the engine was stopped when the collision took place, but I think I saw the fireman putting on the tender break. The carriages would have stopped in about 20 yards.

* This is a second instance within a period of four months of the fracture of the couplings of passenger trains on the Caledonian Railway, a species of accident said by some railway authorities, when arguing against the non necessity of *automatic* breaks, to be of the rarest occurrence.

Conclusion.

This collision was caused by want of caution on the part of driver Stewart, who, without receiving permission from the signalman at the north-end of Perth station, and fearing that he was late, approached the train from Edinburgh, which he was to take on to Aberdeen, while it was still in motion towards him, he being, as he states, under the impression that the train had come to rest.

The practice of pushing trains into stations, convenient as it no doubt in some cases is, is always attended with a certain amount of risk, as the driver can never get a proper view to the front. Had this practice not prevailed at Perth the present collision would have been avoided.

I have, &c.

The Secretary,
(Railway Department,) Board of Trade.

C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on the 26th September.

CALEDONIAN RAILWAY.

Board of Trade, (Railway Department,)

31st August 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 3rd instant, the result of my inquiry into the circumstances connected with the accident which occurred on the 30th ultimo, between Holytown and Whifflet, on the Caledonian Railway.

In this case, as the 12 o'clock (noon) train from Edinburgh to Glasgow, consisting of engine and tender and nine vehicles, was running between Holytown and Whifflet the trailing wheels of the tender and the whole of the vehicles (with two exceptions) left the rails close to the Calder Iron Works Junction, about two miles from Holytown, from which spot the train ran about a quarter of a mile before coming to rest.

No passengers or servants of the Company complained of injury.

The intermediate buffers between the engine and tender and the footboard of the tender were broken. The down line was more or less destroyed for about a quarter of a mile.

The line curves to the left, with a radius of 20 chains, where this accident occurred, and is almost level.

Evidence.

1. *Robert Carson*, signalman.—I was on duty at the Calder Iron Works cabin on the 30th ultimo. I came on duty at 7 a.m., to remain till 6 p.m. This was the fourth time I had been on duty since I had passed for a signalman. I had been employed for about six months as a washer and lamplighter. The 12 o'clock noon train from Edinburgh was signalled to me from Burnhouse at 1.21. I was ready for it, and it passed my cabin at 1.23; the distance is about $1\frac{1}{4}$ miles. It passed at a speed of about 25 miles an hour, and when the tender was 10 or 12 yards past the cabin, I saw coals begin to jump off, and when the engine reached the starting-signal I saw that some of the carriages were off the rails, soon after which the train stopped. I then went back to Carnbroe intermediate cabin to block the down line, which remained blocked till 5.30 next morning, single line being meantime worked between Carnbroe and Whifflet South junction.

2. *John McLean*, ganger for about half a mile north and south of Calder Iron Works junction.—I was working at Whifflet south junction when the accident occurred. I got up to the spot without loss of time, and the first marks I found were on some chairs which were chipped on the inside of the near rail of the down line; a short distance further north the wing of a crossing on the near side was next broken. The chairs were then all broken on the six-foot side till the engine stopped, the six-foot rail was in many cases out of the chairs altogether, and a

great many sleepers were split. The line had to be relaid for about 480 yards. I could not say what had caused the accident, but on passing the train I noticed that the hind wheels of the tender and all the wheels except of one carriage were off the rails. All the wheels were close to the outside of the off rail, not fouling the up line.

3. *James Dykes*, driver 31 years.—I was in charge of engine No. 104, which is a four-coupled engine, with a four-wheeled tender. I left Edinburgh punctually at 12 o'clock with a passenger train, consisting of nine vehicles, for Glasgow. I had last stopped at Holytown, which we left at right time. I looked round the six-foot side of the tender at Holytown and observed nothing wrong with it. The trailing journal was not hot. We were due to stop at Whifflet, and I had accordingly shut off steam before coming to Carnbroe Iron Works. I was running past Calder Iron Works cabin, at a speed of about 25 miles an hour, when I observed the tender jump about and go down on the right-hand side. I was not sure at first whether the fault lay with the road or the tender. The first thing I did was to have the tender break applied, and I then reversed, and after a short time put steam against my engine, and we then gradually came to a stand. Only the trailing wheels of the tender were off the rails. The trailing axle of the tender remained nearly horizontal, though it was broken close inside the boss at the right end.

The break-carriage (six wheels) next the tender had all its wheels on the rails, but behind this most of the wheels were off the rails. I noticed that there was a flaw at the broken end of the tender axle. I had been running with the same engine and tender for about three months, and I had no suspicion anything was wrong with the tender axle. It was not possible to see the flaw before the axle broke.

4. *William Sommerville*, guard 13 years.—I started punctually with the 12 o'clock train from Edinburgh, via Holytown, to Glasgow. The train consisted of nine vehicles, including a break-carriage and break-van in front, and a break-van behind, in the latter of which I was riding. We left Holytown at right time, 1.18, and at about 1.22, 200 yards after passing Calder Iron Works cabin, I felt the van jump and then drop, after which it stopped in two carriage lengths. I had my break on for stopping at Whifflet. I was not thrown down or hurt. I got out at once, and found that most of the wheels of the train were off the rails, and that the trailing axle of the tender was broken at the right end. The passengers were transferred into another train after a delay of half an hour. None of the

carriage wheels were above a foot from the right rail, so that the up-line was not fouled. There were no complaints from passengers, of whom there were about 150 in the train.

5. *James Brown*, guard 2 years.—I was riding in the break-van, the next vehicle but one to the tender, of the 12 o'clock train from Edinburgh. On passing Calder Iron Works cabin, at a speed of about 25 miles an hour, I felt the van give a lurch to the right; I applied my break; the van kept the rails till it had passed the iron bridge, when it went off the rails to the right, and ran along the ballast till it came at last to a sudden stop. Before my van left the rails, I had seen the tender off the rails. I did not notice where the carriage behind the van left the rails. When I got out I found that the break-carriage in front of my van was on the rails with all its wheels, but behind the van all the wheels were off with the exception of those of one carriage and one pair of another carriage. I was not thrown down nor hurt; it was a rough ride. I heard no passengers complain of injury; there were a good many in the break-carriage next the tender.

Conclusion.

This accident occurred in consequence of the breaking of the trailing axle of the four-wheeled tender of the engine of the 12 o'clock train from Edinburgh to Glasgow, as it was passing Calder Iron Works Junction, at a speed stated to have been about 25 miles an hour. The axle broke at its right end, close to the inside of the boss of the wheel. It was made of toughened cast steel by Rowan and Company, and brought into use in October 1867. Its mileage is not known. Its diameter was $5\frac{5}{8}$ inches in the centre, $5\frac{1}{2}$ inches at the inside of the wheel seat, and $5\frac{1}{4}$ inches at the outside of it, there being a shoulder near the centre of the seat. There was a flaw visible on the surface of fracture, extending over rather more than one third of the surface. This flaw would not have been visible without the removal of the wheel, and had probably been gradually increasing for some time past. The wheels had never been removed from the axle.

The right rail of the permanent way began to be displaced almost immediately after the spot at which the axle appears to have broken, and it is singular that the vehicle next the tender should have remained with its wheels on the rails, almost all the other vehicles having left the rails.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on the 26th September.

CALEDONIAN RAILWAY.

Board of Trade (Railway Department),
13, Downing Street, London, S.W.,
27th August 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 3rd instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 1st instant at Perth station on the Caledonian Railway.

In this case, the 12.40 a.m. Highland Company's down mixed passenger and goods train from Perth to the north came into collision with a portion of the 6.40 a.m. Caledonian Company's up goods train from Aberdeen to Perth, which portion had become separated from the remainder of the train in consequence of a draw-bar having come out, and owing to which two waggons had been thrown off the rails foul of the down line.

No passengers or servants of either company were injured.

In the Highland Company's train the engine had its side and buffer beam damaged, and seven waggons were damaged.

In the Caledonian Company's train four waggons were more or less broken up.

Description.

This collision took place about 600 yards north of the north end of Perth station, and about 60 yards south of Dovecotland signal cabin, where sidings join the up line. Another signal cabin, called Glasgow Road Bridge, at the junction of passenger and goods lines, is situated about a quarter of a mile south of Dovecotland cabin. The signalmen in these cabins communicate by means of electric bells.

Evidence.

1. *Robert Aytoun*, driver with the Highland Company nine years.—I started from Perth station at 12.50 a.m., 10 minutes late, having had to shunt vehicles from a train from the south. My train was a mixed one, consisting of 20 waggons, 2 break-vans, a composite with sleeping saloon, 2 foreign saloons, 3 horse-boxes, and a third-class carriage—29 in all—one break-van being at the rear of the waggons and the other at the rear of the train. My engine was a four-coupled one. It was a dark foggy night. There were no signals against me after starting, and the Dovecotland cabin down home-signal was off when I passed it, at a speed of about 9 or 10 miles an hour. Just after passing it I felt the engine strike a waggon which was foul of the down line, of which I had seen nothing previously. It was only the right-hand corner of the buffer beam which struck it. I shut off steam at once and reversed my engine, and stopped in about 50 yards. The draw-bar of the vehicle next the tender had given way, and we left the whole of the train behind. I don't know whether the Caledonian train was in motion or not when I struck the waggon. I had seen the tail lights of the van of the goods train (showing white to the front) as I was passing under the Glasgow Road bridge, and I had also seen the engine pass before I had started from No. 2 West Dock. On going back I found the front seven waggons of my train all in a mess, and also some of the Caledonian waggons. We got away at 2.15 a.m. with the same engine and carriages and a few of the waggons.

2. *John Mackay*, guard, about six years with the Highland Company.—I was in the rear van of the 12.40 a.m. mixed train on the 1st instant. It consisted of 29 vehicles in all. We started at 12.50 a.m., having been detained a few minutes waiting for the signal, which could not be lowered till the Aberdeen up goods train had crossed out of our way. I saw this goods train pass, but did not observe whether it had any tail lights. We then started, and just by the ticket platform I felt a jerk, and immediately afterwards the train came to a stand. I was not knocked down, but got a bit of a heave. I have not been off duty. I immediately went forward, and all was right to within about nine waggons from the front, and these were more or less heaped about. I could not ascertain how many Caledonian waggons were off the road. I heard no complaints from any passengers, of whom there were between 50 or 60 in the train. We eventually got away at about 2.15 a.m.

3. *John McLennen*, breaksman three years.—I was in the break-van at the rear of the waggons of the 12.40 a.m. train, and shortly after starting I felt a shock, and then a second one, upon which the train stopped. I was knocked back in the van, but not hurt. Seven waggons in my train were more or less destroyed.

4. *John Stewart*, driver 6 years.—I joined the 6.40 a.m. local goods train from Aberdeen to Perth, at the Bridge of Dun, the train engine having broken down, and I left the Bridge of Dun at 8.20 p.m., 7 hours 35 minutes late. I arrived at the Dovecotland cabin, Perth, at 12.40 a.m. with a load of 46 waggons and a van. I then put off the 7 waggons next the engine into the east sidings, and immediately rejoined my train; the guard coupled on, and I at once started

for the South goods yard, having the distant and home signals from the Glasgow Road Bridge junction off for me. I had started and got some 40 or 50 yards south of the bridge when the home-signal was thrown up. I shut off steam, but had not come to a stand, when on giving the junction whistle the signal was again lowered, and I again proceeded, getting also a white hand signal from the signalman, who was at the cabin window as I passed at 12.48, and who asked me what the train was. I said it was the 6.40 goods from Aberdeen. I then proceeded to the North British yard, quite ignorant that I had left part of my train behind me. I had looked back on passing through the Glasgow Road bridge after having been stopped, and had then seen my van lights all right, and at the proper distance from the engine. I had felt no symptoms of any of the train having broken away, and had been particular in starting gently. The fireman and the guard were both with me on the engine, when I started from Dovecotland. The guard should not have been on the engine, and I ought not to have allowed him to be there. (See Rule 246.)

5. *Alexander Douglas*, breaksman six years in the Caledonian Company's service.—I started from Aberdeen punctually at 6.40 a.m. on the 31st July, with the slow goods train for Perth. At Laurencekirk the train engine broke down from a burst tube, and after a delay of about two hours we were taken on to Bridge of Dun by the 10 o'clock train from Aberdeen, and there, after a detention of seven hours, we resumed our journey with a fresh engine, and reached Dovecotland cabin at 12.40 a.m. The yard men then uncoupled the seven waggons next the engine, which the driver put into the east siding and then rejoined his train. I coupled on, and then got on to the engine. This was against the rules, as I ought to have got into the van, though what I did is a common practice in goods yards. We started at once, the signals being clear for us, but after having come on a bit, the home-signal was thrown up, upon which the driver came nearly to a stand. Upon his whistling, it was, however, again lowered, and he then proceeded cautiously, and I had no idea we had left any of the train behind us. I don't remember the signalman asking the driver any question. I think he was looking out of the window as we passed. We reached Dovecotland cabin with 46 waggons and a van (the full load is 49), and started thence with 39 and a van, and 30 remained attached to the engine after the accident. The draw-bar was gone from the rear end of the 30th waggon, which I believe was single coupled. (Rule 193 states that the guard must always ride in the van.)

6. *William Dalgleish*, signalman, two years in the service of the Perth General Station Committee, about five months in the Glasgow Road Bridge cabin, and previously in the cabin at the north end of the platform.—I communicate with Dovecotland cabin by telegraph bell, but there is no block telegraph working between the two cabins. I got two beats from Dovecotland cabin—meaning that an up goods train wanted to cross into the up goods line—while I was shunting with the 12.40 Highland train, and as soon as the road was clear I lowered both my signals for the goods train, and it passed at 12.44 by my clock. I made the entry in my book at the time. I had not lowered the

goods line signals for some time previously, but a few minutes before the goods train crossed, I had lowered the top arm for the Highland train to set back along the up road into the general station. I was standing at the cabin window while the goods train was crossing, and the driver said it was the 6.40 Aberdeen goods. I showed him a white hand light. I watched till the whole of the train had passed, and not seeing any tail lights, concluded part of it had been left behind, and I thought it might have broken away. I in consequence came out of my cabin and went 50 or 60 yards north to see if the crossing was clear, and seeing nothing of the tail of the train, came back to my cabin and lowered my signal for the Highland train to start. I was sure the train was not coming, as I could see a good bit north. I heard the noise of the collision as the Highland train passed at 12.48. I let the goods train cross, not being sure when the Highland train would be ready to start.

Stewart, upon being re-called, adheres to the statement that the goods signal was off when he first started, and was then raised and then lowered again on his whistling.

Douglas also adheres to his statement about the lowering, raising, and lowering again of the signal.

Stewart's fireman makes the same statement as his driver with regard to the signal being lowered, raised, and then lowered again.

7. *James Guild*, 21 years signalman in the Caledonian Company's service, all the time in Dovecotland cabin.—There is telegraph bell communication between my cabin and Glasgow Road Bridge cabin. The Aberdeen goods train arrived at 12.40 a.m., and the engine at once put seven waggons into the east siding, after which the engine immediately rejoined its train. I rang it on to Glasgow Bridge at about 12.45 or 46, and the train started at 12.47. I watched it pass the cabin, and noticed that the van stopped when about 30 or 40 yards south of the bridge. I also noticed that the Glasgow Road Bridge home-signal for the goods train was showing red when the train was running past the cabin. But I had not seen it showing green previously. I did not see it at all afterwards. Soon after this, seeing the van did not move and hearing the beat of an engine, I suspected that the train might have broken in halves, and at about 12.50 gave Dalgleish nine beats on the bell, meaning stop train and examine it. I don't think Dalgleish acknowledged this. The collision occurred about 12.52. The Highland engine and waggons had passed my cabin about 12.30, and had not again passed. I had lowered my home and distant signals for the Highland train before I gave the obstruction signal. It never occurred to me that the down road might have been fouled.

Dalgleish re-called.—I received nine beats from Guild after the engine and part of the Aberdeen goods train had passed, and by that I knew that there had been a break in the train.

Conclusion.

This collision was caused by the main down line, about 600 yards north of the north end of Perth station, having been obstructed by a waggon of an up goods train belonging to the Caledonian Company (without the knowledge of the signalmen to either of the cabins, one 380 yards south of the point of obstruction, and the other 60 yards north of it, or of the driver or guard of the goods train) just before the 12.40 a.m. down mixed train, belonging to the Highland Company, was allowed in leave the station.

The obstruction was caused by the draw-bar having been pulled out of the rear of the 30th waggon from the front of the goods train, as it started to cross to the goods yard after having been stopped at the Glasgow Road home signals, one or more of the nine waggons left on the train having in consequence been thrown foul of the down line. The cotter which had given way and had allowed the draw-bar to be pulled out of the waggon could not be found after the collision.

Notwithstanding the accident to the goods train no collision need have resulted,—

1st, if the Caledonian Company's goods guard (*Douglas*) had been, where it was his duty to have been in the van of his train instead of on its engine. He would then have known that an accident had happened to his train and would have had time to protect the down line before the Highland train approached.

And, 2nd, if the signalmen at Glasgow Road Bridge and Dovecotland cabins had taken the reasonable precaution, before lowering the signals for the Highland train, after knowing that the goods train had separated, of going to see what had actually occurred to the rear portion, instead of the one merely ascertaining that there was no obstruction of the line within a few yards of his cabin, and the other not even taking this precaution.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Caledonian and the Highland Railway Companies on the 12th September.

CITADEL STATION (CARLISLE) LINES COMMITTEE.

SIR,

Carlisle, 12th July 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 5th instant, the result

of my inquiry into the circumstances connected with the collision which occurred on the 2nd instant, near the Citadel station, Carlisle, on one of the lines belonging to the Citadel Station Committee.

In this case, while a North-Eastern Company's relief passenger train from Newcastle to Carlisle (running 10 minutes in advance of the ordinary 10.20 a.m. train from Newcastle to Carlisle in consequence of Carlisle races) was standing near the Crown Street cabin down home-signal for the North-Eastern line, it was run into by the 10.20 a.m. regular passenger train from Newcastle to Carlisle.

Sixty-one passengers have complained of injury, but it is stated that (with perhaps one exception) the injuries are not believed to be of a serious character.

Two servants of the company were injured.

The damage to rolling stock was confined to the rear van and two rear carriages of the relief train, of which the buffers were damaged, the bodies shifted on the frames, and the guard's look-out knocked in.

Description.

The access to the south end of the Citadel station, Carlisle, is controlled from No. 5 (crown Street) signal-cabin near the entrance to the station. This cabin has not been renewed in the course of the recent alterations in the neighbourhood of the station, but the interlocking of the points and signals has been rectified where necessary. As regards down trains approaching the station from the North-Eastern line, there is a down home-signal 206 yards from the cabin, and a down distant-signal 500 yards from the home-signal. The home-signal (which cannot be lowered until one of the signals over Crown Street cabin, giving access to the various platform and other lines has been previously lowered) can be seen for a very short distance (30 to 50 yards) 340 yards off; it is then, owing to curves and intervening bridges, lost sight of for 220 yards, when it again becomes visible. The distant-signal can be seen from the ticket platform, a distance of about 1,200 yards, and remains in view for about 850 yards, becomes obscured for 100 yards, and is then in sight for the remaining 250 yards.

Next to Crown Street cabin, and 840 yards from it, on the North-Eastern line, is Cabin No. 7 (London Road new cabin), where the North-Eastern and London North-Western goods lines leave the North-Eastern passenger line. This new cabin is provided with proper signals which do not affect the present case.

Between Crown Street and London Road cabins there are two over-bridges, the London and North-Western goods line bridge, and St. Nicholas bridge, owing to which and to the curved nature of the line the view is very much obstructed.

The North-Eastern line falls on a gradient of 1 in 230 from the ticket platform at Petterill Bridge to the London and North-Western goods line bridge, a distance of about three-quarters of a mile, and then rises on a gradient of 1 in 107 towards the Crown Street home-signal.

The van of the relief train could be seen by the driver of the following train for a distance of about 120 yards.

The line is not worked on the block system on the Carlisle side of Petterill Bridge cabin (the next beyond London Road cabin), it being stated that, owing to the number of light engines proceeding to and from the Citadel station and the North-Eastern and Midland depôts at Petterill Bridge it would be impossible so to work it. There are electric gongs in the cabins for the announcement of trains, and the signalmen are instructed to give hand caution signals if trains, &c. follow each other at less than five minutes' intervals.

Evidence.

1. *James Ferguson*, signalman in the Citadel Station Committee's service $4\frac{1}{2}$ years, and all the time in Crown Street cabin. I came on duty at 6 a.m. on the 2nd inst. for an eight hours spell. I keep no train register but I book trains that are delayed. I remember the North-Eastern Company's relief train being signalled on to me from London Road junction at about 12.57 p.m. I acknowledged the signal but did not lower my outside signals as there were three light engines, two belonging to the Midland Company and one to the Glasgow and South-Western Company, stopping at the home-signal, waiting to go into the station. The train drew up properly in rear of the last of the three engines. The next occurrence with

reference to the North-Eastern down line was the receipt of the signal from London Road cabin for the regular train, due at 1.5. I had not previously to this been able to allow either of the engines to proceed as both the up and down lines near the station were blocked. I acknowledged the signal for the regular train but still kept my outside signals at danger. Then on getting the down line into the station clear, I allowed the first Midland engine to proceed, lowering the home-signal for the purpose but at once putting it to danger again. The second engine did not move. As soon as the Midland engine was clear I allowed the second engine (Glasgow and South-Western) to proceed to the north end of the station, again lowering

the home-signal and at once raising it again, and I cannot say whether the collision had occurred before or after this engine had got into motion. The time would be about 1.5. I did not hear the noise of the collision in the cabin. The North-Eastern down distant-signal is always used when the line is clear, but this seldom occurs during the day on account of the nature of the junction, where shunting, &c. is constantly going on. It is an unusual thing to have a passenger train standing at Crown Street home-signal and another approaching from London Road cabin, but it is a daily occurrence to have light engines stopped at the home-signal. Goods trains now never use this line. I have no instructions to work in conjunction with the London Road up distant-signal, but if less than five minutes interval occurs between the passage of two trains or engines I should lower my home-signal, but give the following train or engine a green hand-signal to allow it to proceed. I had in the present case to lower also a signal above Crown Street cabin as each engine was going on to a different line, but neither of the signals so lowered was the one which would have been for the North-Eastern regular train. The home-signal is in all cases preceded by one of the signals above the cabin. The relief train ran into No. 2 dock at 1.10 p.m., after a detention of eight minutes. On receipt of the bell-signal for the second North-Eastern train I at once acknowledged it according to rule.

2. *Thomas Taylor*, signalman in the North-Eastern Company's service about 20 years, about a year in the London Road new cabin.—I came on duty at 6 a.m. on the 2nd inst. for 12 hours. I do not keep a train register. I do not work block system either to Petterill Bridge or Crown Street cabins, but there are bell-signals in each direction for announcing trains. I remember three light engines passing the cabin shortly before the relief train. I am not certain how many minutes had elapsed after the third engine passed and the relief train came up. I gave the relief train both the down home and distant-signal. I did not look at the clock when it passed. I rang it on to Crown Street when I got the signal for it from Petterill Bridge, which was after the third engine had passed. I gave the relief train no hand-signal, nor am I in the habit of using hand caution signals unless two trains are in sight at the same time, one on each side of the cabin. About 10 or 15 minutes after the relief train the regular train was signalled. I passed it on at once to Crown Street and the signal was acknowledged by Crown Street. I took off both my home and distant signals, but gave the driver no hand-signal, not being aware whether or not the relief train had passed Crown Street. The train passed at the usual speed with steam off. The Crown Street distant-signal was on against the train. I cannot see the stop-signal from my cabin. I did not hear the collision occur. The train stopped just within my sight. I am aware that there is a rule as to cautioning trains or engines which follow each other at less than five minutes intervals. I did not notice whether the breaks were on the second train or not. The Crown Street down distant-signal is sometimes, though rarely, taken off.

3. *John Wild*, North-Eastern Company's driver 18 years, and acting as pilot driver to the relief train, the regular driver not being acquainted with the road.—I left Newcastle about two minutes late, viz., at 10.12, and left the Carlisle ticket platform seven or eight minutes late, at about 1 o'clock. The London Road signals were right for us but the Crown Street distant-signal was at danger. Steam was shut off about half-way between Petterill Bridge and London Road, and our speed on passing the Crown distant-signal was about 7 miles an hour. I was prepared to stop at or short of the home-signal if necessary. This I saw was at danger till I lost sight of it, and after passing the London and North-Western goods line bridge I saw the last of the three engines standing on the line. I had no difficulty in pulling up before reaching it.

There was an air break applied to the engine and tender but not to the train, which consisted of 16 vehicles, including two vans. We stopped about 5 yards from the rearmost engine. The two leading engines then went away, the home-signal being lowered to allow them to pass. The third engine then drew forward to the signal and we followed it. I had stopped about two minutes in this new position when the collision occurred. Just before it the home-signal was again lowered for the third engine to proceed, and it had got into motion and we were preparing to draw up after it, but had not begun to do so. The collision moved us forward a few yards, the engine having been reversed for the moment preparatory to drawing forward to the home-signal. I heard no break whistle before the collision. I could have stopped at the goods line bridge had it been necessary.

4. *John Dobson*, driver for 12 years.—I was not well acquainted with the Newcastle and Carlisle line, and I consequently had Wild with me as pilotman with the relief train. When we first stopped at the Crown Street home-signal there were three light engines in front of us, and we stopped about 5 yards behind the rearmost. In about seven minutes, as far as I could judge, the two leading engines went away with one lowering of the home-signal. The third engine and my train then drew up to the signal. In about three or four minutes the signal was again dropped, and the third engine started, and we were just preparing to follow when the collision occurred. I had got the lever forward (after having reversed), and had applied steam when it occurred. The blow knocked us nearly up to the light engine, which then went away very slowly. We could have stopped at any time in 9 or 10 yards after passing the Crown Street distant-signal at a speed of about 8 miles an hour. The passengers got out of my train immediately after the collision. The third engine had gone away at this time. I cannot say whether the home-signal was off at the time of the collision, but it had been off just before it. I was knocked about a bit by the collision. The shock uncoupled the train, and left only four or five carriages attached. I heard the break whistle before the collision.

5. *John Smith*, fireman 5½ years.—I am not well acquainted with the Carlisle line. I agree generally with the driver's statement. The third engine was about 5 or 6 yards beyond the home-signal when the collision occurred. I believe that the home-signal was lowered at the time. The collision did not knock us forward beyond the signal.

6. *James Moralee*, guard eight years.—I was in charge of the relief train from Newcastle to Carlisle on the 2nd. It consisted of 16 vehicles, including two vans, one front and rear, with a guard in each. I was in the rear van. The train was provided with the ordinary breaks. We started two minutes late, and were stopped at the Crown Street home-signal at 1.5 p.m., 10 minutes late. We stood about one minute, and then drew forward towards the signal, the light engines which had been in front of us having received a signal to proceed. We stood about five minutes in all, and I believe all the engines had then gone forward. I knew that the 10.20 train was closely following us, and looked back several times to see if it was coming, and at last I did see it, and thinking it was coming too fast I jumped out of the van, crossed the up line and got clear before the collision. The speed of the 10.20 p.m. train was 6 or 7 miles an hour. They were evidently trying to pull up. I saw one person jump off the engine just before the collision. I considered we were efficiently protected by signal, and did not think it necessary to go back (see rules 213, 219, and 276 in Appendix). The collision occurred at 1.10 p.m. My break was off at the time. I considered the distant-signal being at danger sufficient protection, though I was round a curve, and knew the other train was following closely. I heard no break

whistle given by the driver of the regular train. I could not tell whether its engine was reversed or not. I have often been stopped at the same place, but never behind another train.

7. *Alexander Rennie*, guard about three years.—I was in the front van of the relief train. I concur in the evidence of the driver with reference to the movements of the three engines.

8. *George Wild*, driver 39 years.—I have been all my life on the Newcastle and Carlisle line. I left Newcastle at about 10.22 or 23, two or three minutes late, on the 2nd instant, with engine and tender, both provided with the ordinary hand breaks, the train consisting of 13 vehicles, including two vans, one at each end of the train, with a guard in each, with the ordinary breaks. We lost no time in running but were detained a few minutes by block, and reached the Petterill Bridge ticket platform about 10 minutes late. On leaving the latter Locomotive Superintendent Laidlaw joined the engine. This did not in any way relieve me from my charge. The London Road distant and home signals were off for us when we left Petterill Bridge, and I saw for certain that the Crown Street distant-signal was against us when near the London Road Bridge (about 250 yards off). On seeing this I applied both engine and tender breaks, and passed the distant-signal at a speed of 7 or 8 miles an hour, prepared to stop at any point if I saw it necessary. Our speed got slower till we came to St. Nicholas Bridge, about 133 yards further on. (Steam had been shut off about 100 yards before reaching the London Road signals.) On passing through St. Nicholas Bridge I saw the Crown Street home-signal off, and in consequence eased the tender break slightly, and somewhat increased the speed. I had not my steam on, and on approaching the London and North-Western goods line bridge I saw the van of the relief train. I at once applied the tender break, while Mr. Laidlaw reversed the engine without releasing the engine break. I also gave the deep whistle once on passing through the bridge, and I believe the guards applied their breaks. Our speed might have increased to 6 miles an hour after easing the tender break, and our speed on collision was very slow; in 5 yards more I am sure we should have stopped. Mr. Laidlaw jumped off, but neither I nor the fireman did so. No damage was done to the engine. I have never seen the Crown Street distant-signal off except for the 7.15 a.m. train. Had I not seen the home-signal lowered I should not have struck the other train. This home-signal was still off just before the collision. I observed no engine standing in front of the relief train. I got no hand-signal as I passed London Road cabin. I did not ask at Petterill Bridge how much the relief train was in front. We were stopped at Scotby by block, and I expected it to be by the relief train. I have never before known the home-signal lowered after the distant-signal had been at danger, while any obstruction remained at the home-signal. I consider that the guard should have been back. He told me that he thought it was block-working. Mr. Laidlaw got up to the van of the relief train before the collision.

9. *James Laidlaw*, locomotive superintendent at Carlisle.—I joined the engine of the 10.20 train at the ticket platform. I concur in all that the driver has stated. I did not myself notice the home-signal being off, but Wild said it was before seeing the van. On seeing the van I reversed the engine, putting on steam, but leaving the engine break applied. I was not far from the van of the relief train when I jumped off and reached it before the engine struck it. My idea was to run up and prevent the passengers getting out of the relief train.

10. *Edward Lazenby*, assistant guard.—I was riding in the front van of the 10.20 train from Newcastle. Our speed on passing the Crown Street distant-signal was 6 or 8 miles an hour. This signal was at danger on coming through St. Nicholas Bridge. I saw the home-signal off, and about at the next bridge I saw the van of the relief train. I did not hear the driver give the break whistle. My break was on when I saw the van of the relief train. I gave it an extra turn or two, and prepared myself for the collision. I had no time to jump out. I did not notice the speed of the train increase on seeing the home-signal off. The speed was not much more than a walking pace on the collision occurring. I should have gone back had I been in the position of the rear guard of the relief train, knowing that there was a train following mine.

11. *John Brown*, guard four years.—I was in charge of the 10.20 train from Newcastle. We started at 10.22, and were detained by the relief train at Haydon Bridge, Low Row, and Scotby, about two minutes at each station, and we left the Petterill Bridge ticket platform nine minutes late. I saw that the Crown Street distant-signal was against us. We passed it at a speed of 7 or 8 miles an hour. My break was on at the time, and had been on since I had seen the signal at danger. I did not see the Crown Street home-signal off, nor the tail of the relief train. I did fancy that the driver had released his break when he was between the two bridges. I did not hear the break whistle. The collision took me unawares, but I was not knocked down nor hurt. The speed was 5 or 6 miles an hour when the collision occurred, at 1.12. We got into the station at 1.27. I do not think any passengers were injured in my train. Had I been in the position of the rear guard of the relief train I should have gone back to protect my train on account of the curve.

Observance of distant-signals.

Rule 276. When an engine-driver finds a distant-signal at "danger" he must immediately shut off steam, and reduce the speed of his train, *so as to be able to stop at the distant-signal post if necessary*; but if he sees that the way in front of him is clear, he must proceed slowly and cautiously within the distant-signal, having such control of his train *as to be able to stop it short of any obstruction* that may exist between the distant-signal post and the home-signal, and must bring his train to a stand as near the home-signal as the circumstances of the case will allow.

Conclusion.

This collision between two passenger trains was due primarily to the driver, George Wild, of the North-Eastern Company's regular train—an experienced driver of 39 years service, all the time on the Newcastle and Carlisle line—having mistaken the lowering of the Crown Street down home-signal (which was visible by him for a few yards when 340 yards distant from it, but which had been taken off to allow an engine in front of the relief train to proceed to the station) as a signal intended for his own guidance. In consequence of this he released his tender break on a falling gradient of 1 in 230, and was thus unable sufficiently to reduce his speed on catching sight, about 120 yards off, of the van of the relief train, to avoid coming into collision with it, though for 100 yards of this distance there was a rising gradient of 1 in 107 in favour of stopping. An experienced driver such as Wild, knowing so well the local

circumstances of Carlisle station, and knowing that the relief train (for which he had been detained more than once on his journey) must have been close in front of him, should not have been misled by having seen the Crown Street home-signal lowered when it was first visible (340 yards off) for a few yards, and should not have assumed that it was meant for his guidance, but should still have proceeded prepared to stop any moment. I think, therefore, that while allowance is to be made for Wild, he must be deemed to have erred greatly in judgment on the present occasion.

I also consider that Guard Moralee, the rear guard in charge of the relief train, is to blame for not having gone back to protect it. The *letter* of the rules quoted in the Appendix might perhaps absolve him from legal responsibility, but knowing that the regular train was closely following (and indeed, as he says himself, looking back several times to see if it was coming), he was greatly wanting in common prudence in not going a few yards back to give the approaching driver warning. There was not the usual excuse in this case of any fear of being left behind.

As there was a greater interval than five minutes between the two trains passing London Road cabin, the signalman there is not to blame for not having given the driver of the regular train a caution hand-signal; this signalman, however, appears never to look at his clock to ascertain five minutes intervals, but gives caution signals only when he can see two trains in sight at the same time, a laxity of practice for which he should certainly be called to account.

No other servants of the Citadel Station Committee, or of the North-Eastern Company, appear to be deserving of blame.

With regard to the prevention of like collisions in future. (1st.) It is desirable that the momentary distant sight of the Crown Street down home-signal should be done away with. This can easily be accomplished by means of a short screen on an over-bridge.

(2nd.) While admitting the present impossibility of working absolute block system between Petterill Bridge and Crown Street cabins, it is deserving of serious consideration whether it would not be possible, with some slight addition to the existing arrangements, to introduce a modified block system, viz., to block before and behind all *passenger* trains, of which there are in all 15 up and 14 down trains during the 24 hours. If this, after due inquiry, is considered impracticable, then the signalman at Crown Street and London Road cabins should be instructed to work in connection, that is to say, so long as one signalman's distant-signal remains at danger the other signalman should keep his home and distant-signals at danger, and then on having stopped a train or engine, allow it to proceed with a caution.

Had the driver of the North-Eastern train been provided with an efficient continuous break he would have no doubt have been able to stop his train in time to have prevented the collision.

The reason of the large number of injuries (61 cases) was owing to the passengers in the relief train being mostly on their legs preparing to jump out. Judging by the slight damage to rolling stock the collision itself could not have been very severe.

I have, &c.,

The Secretary,
(Railway Department),
Board of Trade.

C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Citadel Station Committee and the North-Eastern Railway Company on 22nd August.

APPENDIX.

EXTRACTS FROM THE NORTH-EASTERN RAILWAY COMPANY'S RULES AND REGULATIONS.

Irregular stoppage of trains by accident or otherwise.

213. When a train is stopped by an accident or from any cause (except where it is efficiently protected by fixed signals), the guard, if there be only one, or the rear guard if there be more than one, must immediately go back 1,200 yards to stop any following train, and must, in addition to his hand-signals, take not less than six detonators (which are to be used by day as well as by night), and he must place upon the line of rails on which the stoppage has happened, at a distance of 400 yards from his train, one of the detonators, at a distance of 800 yards another detonator, and at a distance of 1,200 yards two detonators, ten yards apart, and also conspicuously exhibit his hand danger-signal to stop any coming train. The guard must not return to his train until recalled by the engine-driver sound-

ing the whistle of his engine, and when recalled, he must leave the two most distant detonators, and return to his train, taking up the other detonators on his way. Should the guard be recalled before reaching the distance of 1,200 yards, he must place the two detonators at the point from which he is re-called.

Trains stopped between home and distant signals.

219. When trains are stopped between the home and distant signals, guards must not consider them protected by the distant-signal, unless the engine is near to the home-signal, but they must go back and protect their trains as directed by Rule 213.

NOTE.—*This rule does not apply where, owing to another signal-box being near, the distant-signals are fixed at less than the usual distance from the home-signals, and where the signals are repeated from such other signal-box.*

DUBLIN, WICKLOW, AND WEXFORD RAILWAY.

Board of Trade, (Railway Department),
13, Downing Street,

SIR,

30th June 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 24th April, the result of my inquiry into the circumstances connected with the accident which occurred on the 19th April at Bray Head stone siding on the Dublin, Wicklow, and Wexford Railway.

In this case the 2 p.m. down passenger train from Harcourt Street station, Dublin, to Wexford ran into a stone siding at Bray Head, about a mile on the Wexford side of Bray station, the facing-points leading from the main line (which is single) to this siding having been inadvertently left open for the siding.

No passengers or servants of the company were injured.

Neither the engine nor any vehicles in the train left the siding rails, but the carriage next the engine had its side damaged and four panes of glass broken by coming into collision with a stone spout about 200 yards from the facing-points, a short distance beyond which spout the engine was pulled up.

Description.

The siding at which this accident happened formed originally part of the single main line from Bray to Wexford. In consequence, however, of its dangerous proximity to the edge of the cliff at Bray Head, and to some wooden viaducts upon this part of the line, a deviation line, about 56 chains in length, was constructed and completed in September 1876, a portion of the abandoned line being retained as a stone or quarry siding, with an entrance to it by means of facing-points (to down trains) at its northern end, the connection at the southern end being severed. In the report of the inspection of the deviation line, dated September 23rd, 1876, the inspecting officer remarks that "this junction requires to be controlled by a blind siding interlocked with the signals, and the junction distant signals require to be repeated," and subject to these and other conditions the opening of the deviation line was recommended and sanctioned by the Board of Trade on September 26th, 1876. A reinspection of this junction took place on the 22nd June 1877, when the inspecting officer reported "that the home and distant signals at the junction of the deviation line with the old line are completely out of order, and cannot be used." It appears that these signals were shortly afterwards put into working order; but no instructions seem to have been issued for their use, and up to the occurrence of the present accident they were always allowed to stand at danger, and were consequently disregarded by engine-drivers. The charge of the quarry siding was confided to a watchman, who had also the duty of patrolling the line in the immediate neighbourhood of the points, to see that the line was free from obstruction before the passage of any train, he making use of hand-signals, and stationing himself—in the case of down trains—near the repeater of the down distant-signal (which is situated 220 yards from the facing-points), in which position he could be seen for some distance off.

The line is level for some distance on each side of the facing-points, but there is a sharp ascent from Bray till this level portion commences. About 200 yards (along the siding) from the facing-points there is a stone-breaking machine with a spout projecting from it for loading waggons, and it was this spout which struck the side of the first carriage in the train.

The line is worked with the train-staff and ticket.

Evidence.

1. *Edward McDonall*, in charge of the stone siding at Bray Head.—I have been in the service as watchman along the cliff for 24 years, and for the last year I have been in charge of the stone siding. When I first took charge of the siding the fixed signals were not used, and I followed the same plan that I had seen my predecessor employ, viz., to signal both up and down trains past by flag; to signal down trains I was in the habit of going out as far as the down distant-signal repeater, showing a green flag if the points were right, and red if they were wrong. Within the last year I have never had occasion to use a red flag; I do not know why the fixed signals were not used and I never inquired. I came on duty

at 5 a.m. on the 19th April, to remain till 5 or 6 p.m. At about 1.30 p.m. I had opened the siding-points to allow an engine from Bray to go into the siding to take a stone train back to Bray. As soon as the train had gone, at about 2 o'clock, I walked down the line from the weigh house, about 300 yards, to see that no rock had fallen on the line, and then returned as soon as I could to the down distant-signal repeater to be ready to signal the 2 o'clock down train, and as I passed the points I did not observe that they were open for the siding, and it never occurred to me that I had forgotten to close them. The train came in sight as I got to the spot, and I showed the driver a green flag. The train passed me at the usual speed

of about 15 miles an hour, and it never struck me that the points were wrong till I heard the engine give the alarm whistle when close to them. I ran back as fast as I could and found the whole of the train in the siding on the rails, the first carriage having stopped nearly opposite a stone spout, which had injured its side. The train resumed its journey in about a quarter of an hour as it was.

By Mr. Maunsell.—I followed the same mode of working at the siding which I had seen Smith, my predecessor, employ, viz., by hand-signal. I looked both to the engineer and traffic manager as my masters.

By Mr. Smith, resident engineer.—I remember telling you that I had had no instructions from the assistant traffic manager as to working the fixed signals. I remember your telling me to see that the signals were in working order, and I found they were working all but one, which was afterwards put right. The assistant traffic manager once asked me why I was not working the fixed signals, and I told him I had no instructions.

2. *Daniel Smith.*—At the time of the accident I was acting as watchman on the southern part of Bray Head, but from the opening of the stone siding I had been in charge of the points for about a year, when McDonall took the duty. From the very first I never used the fixed signals at the stone siding, but was in the habit of signalling the trains with flag, according to instructions I had received from Inspector Collins. I had never had occasion to use a red flag with the regular trains.

3. *Thomas Collins, permanent way inspector.*—Smith was the first man in charge of the stone siding-points. I never gave Smith any instructions either as to using or not using the fixed signals, but only as to the use of hand-signals. I considered the fixed signals as belonging to the traffic department. The fixed signals were not in thorough order till McDonall took charge, but I gave him no instructions as to the fixed signals. I was aware that they were not used.

4. *Pete Keely, guard seven years.*—I was in charge of the 2 p.m. train from Harcourt Street to Wexford on the 19th April. It consisted on leaving Bray of engine and tender, a waggon, three carriages, and a break-van, in which latter I was riding. I was not looking out on approaching the stone siding at Bray Head, but hearing the engine give the alarm whistle I looked out, and seeing the train was entering the siding I put on my break and the train was stopped with the engine a short distance past the stone spout. No wheels were off the rails, the side of the carriage next the tender was scratched by the spout, and some panes of glass broken. This was the only damage. The speed when the alarm whistle was given was about 15 miles an hour. The accident occurred about 2.50, and we went on in about half an hour without having to detach any carriages. There were no complaints of injury.

5. *William Tooney, driver 13 years.*—I started from Harcourt Street with the 2 p.m. train for Wexford with a 4-coupled engine and tender, with the ordinary tender breaks. On leaving Bray I had on five vehicles, a guard's van being at the rear of the train. On approaching the stone siding neither I nor the fireman saw the flagman, and I did not see that the points were open for the siding till I was about a rail's length from them, my speed at the time being about 13 miles an hour. I shut off steam, reversed and put it on again, and told the fireman to apply his break, and gave the alarm whistle for the guard's breaks. The train pulled up nicely and stopped just past the stone spout, which grazed the side of the carriage next the engine. After a delay of about 25 minutes we proceeded on the journey with the train as it was. Not seeing the signalman before I came to the points, I concluded I should meet him further on. He came up directly after the engine had stopped. The siding signals have never been used to my knowledge since they were put up.

Conclusion.

From the above evidence it appears that owing to the forgetfulness of Watchman McDonall, in leaving open the facing-points leading to a stone siding at Bray Head, the 2 o'clock passenger train from Dublin to Wexford (to the driver of which McDonall states that he had shown a green flag, implying that all was right for him as regarded the state of the line and facing-points), ran into this siding for a distance of about 220 yards, the only damage done being confined to the side of the carriage next the tender, which came in contact with the spout of a stone-breaking machine. It is very fortunate that the driver was able to stop where he did, for had he run a little further the results might have been far more serious. It is to McDonall's credit that he made a frank confession of his forgetfulness, and did not attempt (as is too often the case), to inculcate others.

Though the immediate cause of the accident was the forgetfulness of the Watchman McDonall, this forgetfulness need not have led to the occurrence of the accident had the signals, put up not long before for the protection of the siding, been properly and habitually used. This, however, appears never to have been the case, and no instructions had ever been issued to the watchmen to use them, or to drivers to obey them. For this omission great blame must be held to attach to the officer or officers of the company whose duty it was to have issued the necessary orders.

The driver of the train (Tooney) states that neither he nor his fireman saw the watchman at all as they were approaching the stone siding. I believe that the watchman was at his usual post, but that Tooney was not keeping a proper look-out. Tooney is therefore much to blame, as even had the watchman been showing a red flag Tooney would not have seen it but would have run into the siding all the same.

I have, &c.,

The Secretary,
(Railway Department),
Board of Trade.

C. S. HUTCHINSON,
Major-Genl. R.E.

Printed copies of the above report were sent to the Company on the 7th August.

DUBLIN, WICKLOW, AND WEXFORD RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., 30th October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 10th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 7th ultimo at Dalkey station on the Dublin, Wicklow, and Wexford Railway.

In this case, as the 11.10 a.m. down mineral train from Westland Row station to Ovoca, due at Dalkey at 12 noon, was passing through that station before backing into a siding out of the way of the up passenger train due at 12.13 p.m., it was run into by an up ballast train which was being pushed from behind, and which had also to shunt at Dalkey for the down passenger train, also due at 12.13 p.m.

The guard of the ballast train was injured, but no other personal injuries were sustained.

In the mineral train the engine had the leading end of the smoke-box stove in and the blast pipe and buffers broken.

In the ballast train the break-van had its body knocked to pieces, and the waggon next it mounted the frame of the van and was broken.

Description.

Dalkey station is a passing-place on the single line between Kingstown and Bray (the doubling of which is now in progress), and there is on the down side of the station a siding entered by facing-points to up trains, these points (worked from the ground) being 87 yards on the Bray side of the loop points (No. 2) which are worked from and interlocked in a signal-cabin, 185 yards distant from them, placed on an over bridge between the platforms; there is an up home-signal, 105 yards on the Bray side of No. 2 loop points, and an up distant-signal 245 yards from the up home-signal. The up distant-signal is interlocked with the loop points, so that it cannot be taken off, when the points are set right for a down train; in consequence, however, of the line being curved and in cutting, and of an over bridge, the distant-signal cannot be seen from the cabin, and it is not repeated; the up home-signal is not interlocked with the points; 192 yards on the Bray side of the distant-signal there is a short tunnel, and the distant-signal can be seen by the driver of an approaching train only from its mouth. In consequence of the line being curved and in cutting, the view from the tunnel mouth towards the station is very restricted. At the distant-signal post the line falls in both directions, at 1 in 100 towards Bray and 1 in 150 towards the station. The collision took place about 170 yards on the Bray side of No. 2 points, *i.e.*, about 65 yards outside the up home-signal, about 180 yards inside the distant-signal, and about 370 yards from the tunnel mouth.

Evidence.

1. *Edward Fitzpatrick*, parcel porter at Dalkey 3½ years.—I understand the working of the signal frame, and was in temporary charge on the 7th inst., in place of Kinsella, one of the regular signalmen, who was sick. I went on duty at 11 a.m. The ballast train had started for Ballybrack immediately after the departure of the passenger train at 11.18, taking the staff with it, and I knew it was due to come back at about six minutes to 12, before the mineral train due at 12. The latter, however, arrived first, at 12.2. I had not set my road for the ballast train, but on hearing the mineral engine whistle I lowered the down distant-signal, and then put it to danger, and then put the selecting bar in the centre notch and made No. 2 points, and lowered the down starting-signal. At that time I had not heard the ballast engine whistle. I was acting in accordance with the station-master's instructions in allowing the mineral train to proceed towards Bray for the purpose of backing into the siding before the ballast train had arrived. The mineral train passed through the station at a speed of about 15 miles an hour, and the van had passed the starting-signal before I raised it to danger; but I had not altered the points, when I heard the mineral engine whistle, before the train was clear of them. I concluded that the whistle was in consequence of the ballast train having appeared in sight of the Points-

man Brien, who was standing at the siding points. I did not move No. 2 points till after the collision, when I closed them to allow the mineral train to push back on to the up line to go into the siding off the up line. I did not hear the ballast engine whistle at all. I heard the crash very soon after the mineral engine whistled. The last time I had used the up distant-signal was for the up train due at 11.13, and I had put the lever into the position of danger after the arrival of this train. I have no reason to believe that the signal was not working properly, and I have not known complaints made of it. The more ordinary way of working is to turn the mineral train into the up line and to let the ballast train go direct into the siding off the down line, but the present course was adopted to expedite the departure of the ballast train after the up passenger train had started.

2. *Henry Campbell*, station-master at Dalkey about 11 years.—Immediately after the departure of the 10.45 down passenger train I asked Hardy, the conductor of the ballast train, when giving him the staff, what time he would be back. He replied, "To meet the mineral train due at 12 o'clock," and I told him not to pass beyond the tunnel until he saw the road clear; he told me he would obey the signals. I told him this intending the mineral train to pass on to the single

line, and then back into the mineral siding before the ballast train arrived. This was done in order to avoid delay to the ballast train, and at the same time not to stop the mineral train in running into the station that I gave the orders in question. The rule is to stop dead at the distant-signal. I have not heard the up distant-signal complained of, but I did not examine the signal immediately after the collision. I asked Porter Brien immediately after the collision if he had seen the distant-signal at danger, and he said he had.

3. *Lawrence Brien*, porter at Dalkey about one year.—It was my duty to hold the siding points for the admission of the mineral train, and I was standing at them at about a quarter to 12. I saw the down starting-signal put to danger after the engine of the mineral train had passed. It passed me at a slow speed. I had seen the ballast train coming round the curve just after the mineral engine had passed No. 2 points, and I held my hands up to the mineral driver. I think he saw me for he at once whistled before reaching the points I was standing at. His steam was off at the time, and I saw the fireman applying his break. He had not stopped when the collision occurred, at which time three waggons and the van were on the station side of the points. They remained in this position until they were pushed back. It was hearing the ballast train approaching that made me look towards it, and I saw the distant-signal at danger, just as the trains were meeting after holding out my arms to the mineral driver. I noticed no droop on the arm. When off it hangs at the position of caution. I have never heard this signal complained of as working badly. I did not see No. 2 points stirred after they had been moved for the mineral train to run through them. The day before this the same operations had occurred; but on this occasion the ballast train obeyed the signals. I could not see the front of the ballast train till it was under the distant-signal. The ballast engine whistled on entering the tunnel.

4. *John Ledwedge*, driver four years.—I was in charge of the 11.10 a.m. mineral train from Westland Row to Ovoca, due to reach Dalkey at 12, and shunt there till the 12.13 train passed. I had some waggons to attach at Dalkey which I reached at 12.2. As I entered the station the down distant-signal and the starting-signal to Bray were off. We are as often admitted into the up line as into the down line, in which case we get the distant-signal and a hand-signal. I had passed the siding points, and had reached the over bridge when I heard the pointsman shout and run towards the engine with his arms out to stop the ballast train. I had not seen the ballast train at this time; but on hearing the shout I whistled, reversed my engine and got steam against it and got my tender break applied, and had just come to a stand when we met the van of the ballast train, which was running at four miles an hour. About five waggons and the van of my train were on the station side of the siding points when we stopped. I did not notice how the distant-signal was hanging after the collision. We neither of us jumped off. The shock was not very great. The driver of the ballast train said it was a very bad job; nothing more than this then passed between us. After this I asked him about the distant-signal, and he said it was down for him. I have never known this signal to work badly before. The engine was not much damaged. No wheels of my train were off the line. I could see the distant-signal from the point of collision, but I did not look at it.

5. *Robert Pickin*, fireman $1\frac{1}{2}$ years.—We entered Dalkey station with the signal down, and just as we were running over No. 2 points, the pointsman, Brien, who was standing opposite the siding points, held up his hands in the 4-ft. space, with his back to us, and then drew back to the points. On seeing this I applied my break and said to the driver there was something up

and to notice Brien; the driver looked ahead and saw the ballast train, but did nothing till we were passing the siding points, when he reversed his engine and got steam against it and whistled. We were very nearly but not quite stopped when the ballast train struck us. Its speed was faster than ours. We neither of us jumped off. It was a heavy blow. I did not observe how the up distant-signal was standing either before or after the collision. I was on the left side of the engine. (The discrepancy between the driver and fireman cannot be cleared up.)

6. *James Keeley*, goods guard.—I was in charge of the 11.10 a.m. mineral train from Westland Row to Ovoca, and I left Kingstown with a load of 13 waggons and a van for Dalkey, where we had to shunt. I noticed the signals were off for us at Dalkey, but I did not notice whether the starting-signal was put back to danger. The engine whistling was the first I knew of anything being wrong, at which time I believe the van was seven or eight waggons lengths on the Bray side of No. 2 points. I looked out and saw the ballast train approaching. I then put on the break tight before the collision, when we were very near stopped. I did not feel much of it. I think one waggon and the van were on the station side of the siding points when we stopped. I did not notice the up distant-signal, whether it was off or at danger, but I saw the home-signal on. Soon after I heard Brien say the distant-signal was up.

7. *John Sterling*, driver seven years, working the ballast train three or four times a week for three or four months.—I started from Dalkey (after having worked with the ballast train all the morning) at about 11.15 for Bray. We left the waggons at Shanganagh and proceeded empty to Bray to leave the staff, and then came back for the waggons with a ticket, and pushed them before us towards Dalkey. I had not heard the conversation between the station-master and Hardy before leaving Dalkey, but I knew I might be detained outside Dalkey if the mineral train had arrived before me and was not back in the up siding. Hardy said nothing to me before I started back. I ought to be back here about 12.8, five minutes before the passenger train is due. I pulled up at Ballybrack to change the ticket. I was running through the tunnel near Dalkey at a speed of five or six miles an hour, prepared to stop if I got any sort of notice at the mouth of the tunnel. I saw the distant-signal as soon as it was possible, as I was looking out for it, and it was well down. On seeing this I came on slowly, without putting any steam on, I had shut it off just as the van came to the distant-signal. I got no indication of anything being wrong till my van was close to the mineral engine, of which I had seen the steam just before. I had not noticed the home-signal at all at this time, but afterwards I noticed it, and it was up, I observed that the distant-signal remained off for a minute or two after I had passed it. I had just time to reverse and put on steam and the fireman partly to apply his break, when the collision occurred. We neither of us jumped off. Hardy was on the engine with us—his proper place. I did not ask my guard at the time how the signal was, but in the evening I heard him say it was down. I have never noticed this signal out of order previously. I have passed it at danger before when going into the siding off the down line. I did not know but what I might have been going in there on this occasion. Immediately before the collision I got a signal from my guard just as I saw the train myself. On Thursday I passed the mineral train at Dalkey, the distant-signal was then at danger against me, and I stopped short of the mineral train.

8. *William Foomey*, acting fireman about three months.—I was on the engine of the ballast train as it was coming to Dalkey on the 7th. The driver said to me as we were coming into the tunnel "Have a look out for the mineral train, as it is due." On emerging

from the tunnel I saw the distant-signal hanging down : no doubt about it ; the speed was then very slow, and we then saw the steam of the other engine after passing the distant-signal. We had not been able to see the home-signal for the steam of the mineral engine. I at once put on my break and the driver reversed and put on steam and whistled. We were going very slowly when the collision occurred. Our guard gave a red flag at the same time that I saw the mineral engine.

9. *Bernard Egan*, breaksman with the ballast train.—I was riding in the van alone. We had 12 waggons and the van to push up from Shanganagh. We came through the tunnel very slowly, as fast as a man could run. As soon as we got out of the tunnel I saw the distant-signal down, it remained down till I passed it. I saw that the home-signal was up on passing the distant-signal. I at once put my break on as hard as I could, and then held out my red flag. I had got my break on before seeing the engine. The collision then occurred. We had nearly stopped ; and I was knocked out of the van and was insensible for two hours. I was injured in the side and head and have not yet gone to work. With the distant-signal off and the home-signal at danger I should expect to have gone into the up platform line. It was expecting to meet the

mineral train that made me put on my break on this occasion. I have never known the distant-signal not acting properly. On the Thursday previously the mineral train was in the siding when we arrived.

10. *Daniel Hardy*, ganger, and in charge of ballast train, which charge I have had for about a year.—Before we started from Dalkey the station-master and I had an understanding that he would keep the signals against us, and let the mineral train into the down siding before we crossed to the up line, and I said I would obey the signals. We proceeded to Shanganagh and came back so as to reach Dalkey at about 12, the mineral train being due at that time. I did not tell the driver about the conversation. I was on the engine. We came out of the tunnel at a slow pace, and I first noticed the distant-signal as soon as the engine left the tunnel, and it was down. I have no doubt about it. It was as low as I have ever seen it. On finding the signal down the driver put on a little steam. We had got past the distant-signal when we saw the mineral engine. I then looked and saw the home-signal at danger. The engine was reversed and the breaks applied. We both of us jumped off. We were going very slowly when the collision occurred. We could have shunted the ballast train at Ballybrack

Conclusion.

The evidence in this case with regard to whether the up distant-signal was or was not at danger when the ballast train emerged from the tunnel is very contradictory. There is little doubt but that the distant-signal lever in the cabin must have been in the position of danger, for the mineral train, which was 105 yards long, had cleared No. 2 points by only 65 yards when the collision occurred (and before it had cleared these points the distant-signal lever could not have been moved without injury to the points), whereas the tail of the ballast train was 370 yards from the point of collision, when the van emerged from the tunnel, and 270 yards from it, when the engine did the same, and as there was probably no great difference in the speed of the two trains, it is next to impossible that the distant-signal lever could have been pulled over in the cabin to the position of clear before the ballast train reached it. It is possible that the arm may not have obeyed the motion of the lever when the signalman had last put the lever back to the danger position after the arrival of the up train at 11.13 a.m. This he could not tell himself as the distant-signal cannot be seen from the cabin and is not repeated (as it ought to have been). The porter (*Brien*), however, who was holding the siding points through which the mineral train had to set back, speaks positively to the arm having been well at danger. On the other hand, the guard of the ballast train declares that the distant-signal arm was down when he saw it upon the van (which was at the front of the train) emerging from the tunnel, and the same statement is strongly affirmed by the driver and fireman, and by the ganger in charge of the ballast train, who was also on the engine. The preponderance of evidence is, therefore, strongly in favour of the signal being off, and it must, therefore, be assumed that the arm had not moved with the lever when the signalman had last put the latter to the position of danger after the arrival of the up train at 11.13 a.m., and the primary cause of the collision may, therefore, be considered to have been the failure in working of the up distant-signal. Looking, however, to the very restricted view between the tunnel mouth and the south end of Dalkey station, the station-master, when arranging for the arrival at about the same time of both an up and down train, showed in my opinion want of judgment in not giving strict orders that the down mineral train should not be allowed to leave the down loop line until the ballast train had entered the up loop line, instead of running the risk of collision on the single line between the south end of the station and the tunnel mouth.

No time should be lost in repeating the up distant-signal so that the signalman may have the means of knowing whether the arm obeys the motion of his lever, and the up home-signal should also be properly interlocked with the points.

*The Secretary,
(Railway Department),
Board of Trade.*

I have, &c.,
*C. S. HUTCHINSON,
Major-General R.E.*

Printed copies of the above report were sent to the Company on the 20th November.

GLASGOW AND PAISLEY JOINT RAILWAY.

SIR, Board of Trade (Railway Department),
13, Downing Street, London, S.W., 12th August 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the Order of the 16th ultimo, the result of my enquiry into the collision which occurred on the 13th ultimo, at Paisley station on the Glasgow and Paisley Joint Railway, between two passenger trains belonging to the Caledonian Railway Company.

In this case, while the second portion of the 6 p.m. passenger train from Wemyss Bay to Glasgow was standing at Paisley station with the rear van about 25 yards inside the junction home-signal, it was run into by a special passenger train from Greenock to Glasgow, which had also to stop at Paisley station.

Thirty-nine passengers have complained of injury, the most serious case being, it is stated, a broken nose. No servants of the Company were injured.

The damage to rolling stock consisted in the engine of the Greenock train having its buffer-beam and buffers broken, and in four carriages having their buffer castings damaged. No wheels were thrown off the rails, and both trains were able to proceed after a short delay.

Description.

Paisley station is situated a short distance east of the junction of the Caledonian Company's line from Greenock, and the Glasgow and South-Western Company's line from Carlisle, &c. It is an exceedingly busy station, especially as regards passenger traffic. The junction cabin, belonging to the Paisley Joint Railway, is situated close to the Greenock end of the platform on the north side of the line, and in it the points and signal levers are properly interlocked. The traffic is worked on the absolute block system between the junction cabin and Glasgow, but it is not so worked between the junction cabin and the next adjacent cabins on the Caledonian and Glasgow and South-Western lines, trains being merely announced by telegraphic bells. The next cabin to the junction on the Caledonian line is Underwood, 970 yards distant. As regards the Caledonian line, the junction is provided with a home-signal 100 yards from the cabin, and a distant-signal 510 yards from the home-signal. The distant-signal is well visible for a long distance. The home-signal can be seen from beyond Underwood cabin, but it is lost to sight for some distance; after which there is an uninterrupted view of it for about 660 yards before reaching it. The van of the Wemyss Bay train could have been seen by an approaching driver from a distance of about 350 yards.

The line is practically level.

Evidence.

1. *Farquhar Matheson*, signalman five years at Underwood cabin, in the Caledonian company's service.—I came on duty at 10 a.m. The regular time to leave is 6 p.m., but this being Saturday night I was to remain on duty till the traffic had ceased, i.e. any time from midnight to 4 a.m. On this occasion I left work after 4 a.m. I have a boy to assist me during the day, but he leaves work at 6 p.m. I work absolute block between my cabin and Boghead by day and Blackstone by night; but between my cabin and the junction the traffic is worked by time; i.e. if one train follows another at less than a five minutes interval, I keep my distant-signal against the second train lower my home and advance signals, and give the driver a green hand-signal as he passes. An exception to this mode of working would be when I see the junction distant-signal clear for the first train to go into the station, the weather also being clear. I would caution a train under such circumstances at three minutes interval, but not at four. I announce trains to the junctions by electric gong; viz., by preparatory signal and one given on the train passing. These signals are acknowledged. The Wemyss Bay train passed my cabin at 7.57 p.m., my signals being down for it. It was going at an ordinary speed. I received

the preparatory signal for the second train about the time the first train passed. I put my signals up (all three) as soon as the first train had passed. This train got the junction distant signal without having to wait for it. On seeing the first train getting clear out of my sight, I lowered my three signals for the second train; and it passed at 8.1 p.m. I gave it no hand-signal. It was going about the usual speed, whistling for the junction distant-signal, which had been put to danger immediately after the first train had passed it. The Wemyss Bay train being a special train, I was not aware that it had to detach carriages for Edinburgh. When a train is detaching carriages at Paisley station its tail is generally in my sight. I did not hear the collision occur, and I was not aware that it had taken place till I was informed of it at about 9.15. I marked both times, viz. 7.57 and 8.1, in the train register by my clock, while each train was between the home and starting signal. I came on duty again on Sunday night at 10 o'clock. A change of duties takes place only once a month.

James Hunter, in the joint-line service 5½ years, signalman three years at Paisley junction.—I came

on duty at 2 p.m., to remain till 10 p.m. I work block on the joint line to Wallneuk, but only by bell signal on the Greenock and Carlisle lines. We observe no time intervals for down trains (i.e., trains to Carlisle and Greenock), as it is necessary to clear the station as rapidly as possible, but if one train is following another closely I give the following train a green flag. I remember the preparatory signal for the Wemyss Bay train being received at 7.54, and the train arrived at 7.57. My signals were off for the train, which drew slowly in, the station-master having decided to put the Edinburgh carriages through the crossing on to the down line, instead of into the siding leading off the up line. The reason for this I am not fully aware of. I put on the distant-signal as soon as the train had passed, and the home-signal as soon as all the train but three or four carriages had passed it. The train was then uncoupled, and the driver drew the Edinburgh carriages clear of the crossing, which I then opened. These carriages were then uncoupled from the engine while still on the main line, and the driver reversed his engine to put them back through the crossing; but by this time I had heard the Greenock train approaching whistling for the breaks, and, seeing a collision likely to take place, I closed the crossing-points before the carriages had reached them, fearing that otherwise the rear portion of the train would be knocked into their broadside, and thinking a collision on the straight road would be preferable. As it was, the two portions of the train only just came together on the up line. The collision between the two trains occurred at about 8.2 p.m. I noticed the second engine as soon as I heard the whistle, and I believe the driver was trying to pull up; the speed was not fast. My home-signal for the first train was put to danger about 7.57. I heard the collision occur. I did not see any passengers jump, but I saw some with their heads out. I saw that my signals were at danger as the Greenock train was approaching. I noticed my home-signal particularly. I called the boy's attention, and he also observed the position of the signals. The tail of the Wemyss Bay train stopped a short distance inside the home-signal. I think the Greenock train was in sight at Underwood when I opened the crossing-points. The engine of the Wemyss Bay train was on the Glasgow side of the crossing-points when the collision occurred.

3. *Donald McKinnon*, 13½ years of age, telegraph boy about one year in Paisley junction cabin.—I entered the times of the arrival of the Wemyss Bay and Greenock trains in the train register on the 13th. I am sure that Hunter put back the home-signal lever as soon as the tail of the Wemyss Bay had passed it. I did not look at the signal at that time. The train was uncoupled as soon as it had stopped; the front portion was drawn ahead past the crossing points, which Hunter then drew. As soon as it had stopped, the front portion was uncoupled, and was starting to come back, when I heard what I believe were break whistles from the engine of the Greenock train, which was then in sight, and remained in sight till it struck. Hunter stepped forward and looked at the train, and said there would be a collision, and altered the crossing points. The collision occurred between 8 and 8.2, as far as I can judge. I made no entry before the collision after 7.59½.

4. *Stewart McCowatt*, station-master at Paisley, in joint-line service since 1st March last, previously at the station up to 1867, 20 years in joint-line service.—I was standing 20 or 25 yards east of the pointsman's cabin when the Wemyss Bay arrived. Expecting that there might be an unusual number of coaches for Edinburgh, it being Glasgow fair, and having the engine for these coaches in a siding on the down side of the line, I thought it better, in order to save time and as being more convenient, to have these carriages put through the crossing rather than into the up line siding, the more usual place. The driver, in the first instance, was prepared to stop clear of the up-line

siding, but either I or the foreman called him on, and he at once came on. I could not say when the home-signal was put to danger. The train stopped with the rear Edinburgh carriage clear of the crossing: it was then uncoupled (i.e., a van and three carriages), and the driver then drew them ahead clear of the crossing points; they then stopped again, and the engine was uncoupled preparatory to putting them through the crossing on to the down line. I am not aware that there is any rule against fly-shunting vehicles containing passengers. I then heard a break-whistle proceeding from an engine apparently on the Greenock road, and I then saw the engine approaching, and that there would be a collision. To the best of my belief I saw the home-signal at danger before it occurred. On seeing a collision inevitable I ran towards the Edinburgh carriages, which were in motion, but had not reached the crossing points; the speed of these was being reduced, and they came very slightly into collision with the rear portion of the train, which was then at rest, after having been knocked forward some distance. The driver of the Greenock train appeared to be perfectly sober, and also the pointsman Hunter, who was examined by the captain of police shortly after the collision. I was station-master at Pollokshaw for five years prior to coming here.

5. *John Hilton*, driver 20 years.—I started from Wemyss Bay at 7.7 p.m., having waited for the steamer from Inverary, with 13 vehicles. I had the Westinghouse break applying to the engine and tender wheels, but not working on the train, although the Glasgow portion was fitted with it, and I used it from Paisley to Glasgow. There were four vehicles for Edinburgh at the front of the train. I got clear signals at Underwood, and the Paisley junction distant-signal was taken off after I had whistled. I approached Paisley, prepared to stop so as to put the Edinburgh carriages into the siding off the up-line, the usual place; but as I was drawing up, a foreman told me to draw forward, as they were going to put them through the east crossing on to the down-line. I accordingly drew forward, leaving the front of the Glasgow portion clear of the crossing. A porter then uncoupled the Edinburgh carriages, and I drew forward over the crossing, stopping with the rear carriage about half a carriage length beyond it. The engine was then uncoupled from the carriages by my fireman, and after standing half a minute or more the crossing-points were moved, and there was then again a little delay before I was waved back by the foreman. I then put on steam to shove the carriages through, but instead of doing so they went along the up-line. I had heard before this, but after I had given them a shove back, a cry to put the break on. I was just on the points, about an engine length from the front carriage when the two portions of the train came together. I know it was against the rules to have fly-shunted the carriages, but it is a common practice. I had heard no break whistle before the collision. I did not notice the position of the junction up home-signal after my train had passed it.

6. *Alexander Creighton*, guard two years, signalman six months previously. I was in charge of the Edinburgh portion of the train from Wemyss Bay. It consisted of four vehicles, a break-van next the tender, a third-class carriage, a first-class, and a composite. We left Wemyss Bay at 7.6 p.m., having been due away at 6, had the steam arrived to time. All went right to Paisley, where we had clear signals, but I did not notice when the home-signal was put back to danger. We were in the first instance preparing to stop at the sidings off the up-line, the usual place for depositing the Edinburgh carriages, but we were signalled forward by the foreman, and the driver drew ahead till the Glasgow portion was clear of the crossing; one of the porters then uncoupled the Edinburgh carriages, which were drawn forward beyond

the crossing points; tickets were then examined, causing about a minute's delay, the carriages were then put back to go through the crossing, but the points had been shifted, and they went back along the up-line till they were stopped by the application of my break, just as they met the Glasgow portion which had been pushed forward by the collision. I had put on my break, having heard shouts telling me to do so. I was not aware that anything wrong had occurred. The collision occurred about 8 o'clock by my watch, the time for arrival having been 7.57. We shunted the van to the rear of the train before starting. None of the passengers in my carriages were injured, nor the carriages.

7. *William Johnstone*, guard four years.—I was in charge of the Glasgow portion of the train from Wemyss Bay. We started at 7.7 p.m.; my portion consisting of nine vehicles, the four rear ones (the rearmost of which was a break-carriage) having the Westinghouse break apparatus. On approaching Paisley we were prepared to stop, so as to put the Edinburgh portion into the usual siding, but the driver was waved forward, and stopped with the Edinburgh portion at the platform. The tickets were then examined, the train uncoupled, and the front portion drawn forward beyond the through shunt points. As soon as the through shunt points had been opened I heard the Greenock train approaching, whistling for breaks. The collision then occurred, while I was standing near the front carriage of the Glasgow portion. My break was on. The collision knocked the carriages forwards 10 or 12 yards, and they just touched the Edinburgh carriages, which were coming back along the up line. We arrived (at a dead stand) at 7.58 by my watch, and the collision occurred at 8.0½ by my watch, which I had in my hand at the time. I observed the home-signal was clear when we arrived, but I do not know when it was put to danger.

8. *Robert Sutherland*, 14 years driver, accustomed to work on the Greenock line for 12 years.—I started from Greenock at 7.29 p.m. with a special train on account of Glasgow fair. The train consisted of 13 vehicles in all, with two guards, one front and one rear. My engine was a 4-coupled goods engine. The tender (six wheels) only had breaks. There was no air break on the train. I had arrived in Greenock about 3.45 p.m. same day. Fireman John Douglas (not my regular fireman) was alone on the engine with me. We stopped only at Port Glasgow for station work, and got signals against us at Marton siding, but nowhere else. I opened my whistle for the Blackston signals, but they were taken off before I entered the section. I found the Underwood signals standing clear, without having to whistle for them. The Paisley junction distant-signal was against me when I approached and passed it at a speed of 10 to 12 miles an hour, prepared to stop at any point. The Paisley junction home-signal was standing off (as far off as I have ever seen it) when I first noticed it near the distant-signal, and it remained off until I had got to within my own train or train and a half's length of the signal-post, and then it was turned to danger. Just at the same time I observed the van of the train in front of me, but I was not certain at first whether it was on the main line or in the siding joining the up line. I immediately reversed my engine and applied steam, having just previously shut off steam, which I had reapplied on seeing the home-signal off, after having shut it off west of Underwood. I at the same time told the fireman to apply his break, and whistled for the guard's break. I have every reason to believe they were put on. The speed was reduced pretty rapidly, and on striking the other train it was about six miles an hour. We neither of us jumped off, nor were we hurt. I did not see the signalman, but I told one of the police authorities that the home-signal had been off till I was within a train's length of it. I had no

notion the Wemyss Bay train was close in front of me. I do not think it would have made any difference to me, had I been cautioned at Underwood, as I found the Paisley home-signal off. I did not act upon my having seen the home-signal off till I was some distance inside the distant-signal. I whistled for the distant-signal as I was approaching Underwood cabin. After stepping off the engine I spoke to the front guard, who said the home-signal was off till we were about a train's length from it. The rear guard said much the same. The fireman also said he had seen the signal off.

John Douglas, fireman 4½ years.—I do not work regularly with Sutherland, but had exchanged duties with his proper fireman for two days. I know the Greenock road well. The first signals we had against us were at Bogston. We then stopped at Port Glasgow. We then got clear signals up to the Paisley distant-signal, which was at danger as we approached and passed it. At the distant-signal I saw the Paisley home-signal hanging clear, i.e., well at caution. The driver in consequence put steam on, which had been shut off before we reached Underwood. About 100 yards from the home-signal it was suddenly put to danger, as I saw myself. Every effort was then made to stop, but we struck the van at a slow speed. I did not see the van till I had seen the signal put to danger. There was no coal shifted on the tender.

10. *John Johnstone*, guard 5 years.—I was in charge of the Greenock train, which consisted of 13 vehicles, including a break carriage next the engine, and a break-van in the rear, in which I was riding. We left Greenock at 7.29, waiting till the train was full. Everything went right till we approached Paisley. We had stopped at Port Glasgow and left it at 7.42. I noticed the Paisley distant-signal at danger, and heard my driver whistle for it, and applied my break. We passed it at 12 or 15 miles an hour. I noticed, when west of Underwood, the junction home-signal showing clear in the usual position, and then again, when near the distant-signal, still clear. I kept sight of it, and saw it go to danger when about two trains length off. The driver at the same time gave the break whistle, but I had my break applied before, and could do nothing more. The collision then occurred at a speed of from six to eight miles an hour. I felt it very little. The time was 8.2 by my watch. The driver had increased his speed, and I had released my break on seeing the home-signal clear.

11. *Charles Beaumont*, porter at Greenock, acting as guard with the special train.—I have acted frequently before as guard. I was in the front break carriage alone. All went right till we approached Paisley, when the junction distant-signal was on. I put my break on in consequence, but I took it off on the driver whistling for it three or four carriage lengths this side of the distant signal, the home-signal being off, as I saw after taking my break off. It was hanging as low as I ever saw it. I saw it go to danger when we were about my train's length off it. I never noticed the van of the other train. I did not know the Wemyss Bay train was before us. The speed on collision was six or seven miles an hour. I hardly felt it. I was not knocked down nor hurt. I was putting my break on when the driver whistled.

12. *Thomas Strays*, Caledonian Company's driver 20 years.—I reached Paisley from Glasgow at 9.20 p.m. on the 13th. After standing some time I noticed a Glasgow and South-Western train come in from the Carlisle direction, and stop at the platform perhaps three minutes before the signal was put to danger to protect it. I drew the attention of four men in the siding to this. This was between 10 and 11 o'clock p.m.

13. *Hugh Hair*, inspector of permanent way in the joint line.—I arrived at Paisley about 8.20, and I remained till past 11 o'clock down about the turn

table, and observed how the signals were working. I saw nothing wrong with the signals, excepting that at a few minutes after 10 I thought a Glasgow and South-Western train had stood too long before being protected,—perhaps a minute, not more. I never saw such a thing occur before. Had it not been put to danger when it was, I should have gone to the signalman.

14. *Joseph Smith*, signalman joint line at Paisley I came on duty at 10 p.m. I do not remember letting any train stand without having at once put up my signals to protect it.

Conclusion.

A careful consideration of the foregoing evidence leads me to the conclusion that this collision was caused by the driver of the Greenock train—which was following the Wemyss Bay train at an interval not exceeding four minutes—having been misled by seeing the Paisley junction home-signal off, as he supposed, for him; whereas it had been allowed to remain off longer than was right after the arrival of the Wemyss Bay train. His attention being thus diverted from the line, he did not see as soon as he might have done, viz., at a distance of 350 yards, the van of the Wemyss Bay train, but reapplied his steam, which had been previously shut off, and had his breaks eased off until he had arrived within (say) 150 yards of the home-signal (*i.e.* within 175 yards of the van), when this home-signal was suddenly thrown to danger. He then appears to have used all the means at his disposal for stopping, but failed to do so before striking, at a slow speed, the tail of the Wemyss Bay train, from which fortunately the engine had been detached. At the same time this driver must have been approaching Paisley, where he had to stop, at an injudiciously high speed, or, considering the extra means which he states he used for pulling up when 175 yards from the train, he would have been able to do so without coming into collision with it.

If, as the evidence tends to show, a minute or two elapsed after the arrival of the Wemyss Bay train before the junction home-signal was put to danger, the signalman Hunter in the junction cabin is to blame for want of promptness. At a later period of the evening, when another signalman was on duty, it would seem that there was a similar delay, which attracted the attention both of a Caledonian driver and of a joint-line permanent way inspector.

Signalman Matheson, in the Underwood (Caledonian) cabin, is also to blame for transgression of the rule by which he is required to keep his distant-signal at danger, and give a caution-signal to any train following another at less than a five minutes interval. Instead of attending to this rule, he seems to have adopted a private rule of his own, according to which he gave the driver of the Greenock train no caution whatever, although it passed not more than four minutes after the Wemyss Bay train, and although the junction distant-signal was at danger. In excuse for this man it is right to state that he had been on duty for 14 consecutive hours when the collision occurred, with the certainty of remaining on four hours longer, or perhaps eight hours, according to the running of the goods trains. These excessively long hours of duty are most objectionable, even although they may occur (as in the present case) only occasionally in changing rounds from the day to the night shift.

The station-master at Paisley hardly acted with the judgment which might have been expected from an experienced officer of 20 years service, in altering the usual mode of dealing with the carriages for Edinburgh, which were at the front of the Wemyss Bay train. Had they, according to custom, been put into the siding leading from the up line, the tail of the train would have remained in sight of the Underwood signalman, who would then properly have stopped and cautioned the Greenock driver. I was much astonished to hear the station-master state that he was ignorant of the rule prohibiting the fly shunting of vehicles containing passengers;—a practice which might have led to a second serious collision in the present case.

With regard to the prevention of the recurrence of collisions such as the present, there would appear to be no other remedy save the block system; and although it may lead to some little delay, I should strongly recommend its being adopted between Paisley junction and the cabins next it on both the Caledonian and Glasgow and South-Western Railways, with such modification of the signal arrangements as may appear necessary for the purpose of minimising delays.

Had the Greenock train been fitted with a good continuous break under the driver's control the collision would probably have been prevented.

I have, &c.

The Secretary,
(Railway Department,) Board of Trade.

C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Caledonian, and the Glasgow and Paisley Joint Railway Companies on the 20th September.

GREAT EASTERN RAILWAY.

Board of Trade (Railway Department),

SIR, 13, Downing Street, London, S.W., 17th August 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the Order of the 26th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 25th ultimo at Beccles junction station, on the Great Eastern Railway.

In this case, as the 7.10 a.m. special excursion train from Eye to Yarmouth (via the Waveney Valley line), was standing on the main up line at the Beccles platform, while the engine was running round its train, it was run into by 13 loaded trucks of sand and a break-van, which had formed part of a sand train from Lowestoft to Stratford, and which had run back down falling gradients of 1 in 66, 1 in 88, and 1 in 133, after having been uncoupled from the front portion of the train about $1\frac{1}{4}$ miles south of Beccles.

Thirty-eight passengers have complained of being injured, the most serious case being one of nervous shock to the system.

In the passenger train the buffers of six carriages were damaged and the buffer rods bent. The body of one carriage was slightly damaged and another had a door broken. No wheels were thrown off the rails.

In the sand train two trucks were damaged.

Description.

Close to the north of Beccles station the line from London to Yarmouth is joined on the west by the Waveney Valley line from Tivitshall junction, and on the east by the line from Lowestoft. There is a dock for Waveney Valley trains on the down side of the line, but no dock on the up side. The signal arrangements have not yet been modernised, and there are a great many siding and other points worked from the ground.

The line south of Beccles curves to the west a short distance from the station, so that the view from the south end of the platform of any vehicles running back on the up line does not exceed 220 yards. Beccles station is situated on a gradient of 1 in 290, rising towards London; proceeding southwards, the gradient changes to 1 in 133 (still rising) for 32 chains, then to 1 in 88, still rising, for about 60 chains, and then to a still rising gradient of 1 in 66 for 52 chains, after which it commences to fall. The trucks commenced to run back from a spot not far up the gradient of 1 in 66.

Evidence.

1. *James L. Wilkinson*, station-master at Beccles 15 years.—The excursion train from Eye drew up at the up platform at 9.15 a.m., the ballast train having started at 9.10, after having stopped here and been examined. I took the staff from the driver of the excursion train, whose engine was then uncoupled from the train, and he went to the turn-table to turn before rejoining his train to go to Yarmouth. He had done this and was standing at the down water-crane before coming across, when the collision occurred. I was in the booking office at the time, which was about 9.25. The excursion train was driven back a considerable distance. I had heard no alarm before the collision took place. The passengers who were injured were spread throughout the train, which was crowded. The worst apparent injury was that of Mr. Haynes, who was about the centre of the train, in a first-class carriage. I had seen the sand train in the yard but had not noticed it particularly. I do not remember any previous run back.

2. *George Baxter*, foreman porter at Beccles, where he has been stationed for 12 years.—I was standing near the south end of the down platform before the collision. Hearing a noise of running trucks approach-

ing the station, I looked up the line and saw the sand trucks running back on the up line. They were then about 50 yards from the front of the excursion train, which was a little south of the south water column. Their speed appeared to be between 15 and 20 miles an hour. I at once ran across round the van of the train and got to the up platform before the collision occurred. I saw that it was no use in attempting to do anything before I got to the up platform, when I tried to keep the passengers away from the open doors. The train was knocked back about its own length. The collision took place immediately after I had reached the up platform. I am not aware that there was anyone up at the turn-table points when the trucks were running back, and when I first saw them they were too close to the cross-over road points to have enabled me to reach them. I could not see whether the wheels of the sand train break-van were skidding. I did not see the guard jump out. I saw him for the first time 5 or 10 minutes after the collision on the up platform. The day was bright and warm.

3. *John Eagle*, shunter at Beccles four years.—I was engaged with the excursion train shutting the doors when the collision occurred. I was then next

the first carriage in the train. I first saw the trucks when they were above the crossing points, some 50 yards off; the noise attracted my attention. There was no one about at the time except Baxter and me. I think the speed was about 12 miles an hour. I saw and heard that the van wheels were skidding. I saw the guard jump into the 6-foot just before striking. On seeing the collision imminent I tried to keep the passengers in the train, but some were standing up and trying to alight when it took place and were injured by the open doors. The train was knocked back nearly to the crossing, but the trucks stopped almost immediately. The engine of the excursion train was at the north water column at the time.

4. *Thomas Brown*, acting guard with the excursion train from Eye.—I was the only guard. The train consisted of 10 coaches and a break-van. The van had the ordinary breaks. The train arrived at 9.7 and had been standing about 10 minutes when the collision occurred. We were 17 minutes late from trains in front of us on the branch. I had put my breaks on after the train had come to rest, as the engine had to run round and rejoin it. I was at the front of the train when the collision occurred, seeing that there was a lamp on what would be the last vehicle. When I saw the trucks approaching about 150 yards off, I picked up a sprag lying in the 6-foot and ran about a break's length along the 6-foot and tried to put the sprag into the front wheel of the truck next the van, the wheels of which latter were already skidding. It, however, did not catch, and before I could try again the collision had occurred. The trucks passed me at about 15 miles an hour. I saw the guard as he was coming round the curve waving his arms, and he shortly after jumped, I believe, on the near side. My train was knocked back about three parts of its length. No wheels were off the rails. I do not think there was anyone nearer the sand trucks than I was. It did not occur to me to turn them through the cross-over road, and I do not think I should have had time to do so had it occurred to me.

5. *Henry Waller*, driver $2\frac{1}{2}$ years with goods trains.—I had not been on the line between Beccles and Ipswich for four years until the present occasion, and I had not often travelled over it at any time. I started from Lowestoft for Stratford at 8.20 a.m., with a sand train for the Locomotive Department. It consisted of 24 loaded sand trucks and a break-van. My engine was a six-coupled engine, cylinder 17 in. \times 24 in., with 4 ft. 10 in. wheels. The maximum load of goods between Beccles and Ipswich is 30 loaded goods trucks, and there is a custom not to take more than 25 loaded sand trucks and a break-van. They were low-sided trucks, and seemed loaded much as usual. The sand appeared dry at the top. We arrived at Beccles at about 8.45, having had no delays on the journey. I took water, and oiled my engine, and started about 9.5, intending next to stop at Saxmundham. I had plenty of steam when I started, 140 lbs., the fire was good, and the coal was also good. The engine did very well up to the third level crossing on the gradient of 1 in 88 (about 1 mile from the station), and it then gradually lost speed till we came to a dead stand near the fourth gate-house. The rails were not at all slippery, and there was no need of sand. The regulator was full open when we stopped. I then shut the regulator and told the fireman to go back and ask the guard to part half of the train, intending to run with the first half to Brampton, about 3 miles distant, and come back for the other half along the up or wrong road. The fireman went back and I did not see how far he went. On his return he said "All right, mate, they are all right now." I did not ask him whether he had seen the guard. I then tried to start with the couplings tight, but, failing to do so, put the reversing lever into the second notch and backed slightly to ease the couplings, and then got forward without any further difficulty, and was not

aware that the back part of the train was in motion. I looked back on going round the curve but did not notice that the rear part of the train was in motion. I then reached Brampton, and stood over the points for 10 minutes, waiting for a down passenger train, as the trucks had to be put on the down line, there being no room in the siding for them. After I had put them across I returned to the up line and asked the signalman if he was right, and he said "Yes," and I then proceeded back on the up road, and not finding the trucks where I had left them came on to Beccles. My mate told me before we started from the top of the bank that he had uncoupled the trucks, but nothing passed as to whether or not he had seen the guard. I had forgotten the instructions contained in rule 283, as to obtaining a written authority from the guard before coming back on the wrong road. The pressure gauge still showed 140 lbs. on the top of the bank, and the steam was still blowing off very strong.

6. *John Fuller*, fireman $2\frac{1}{2}$ years.—I had never travelled the road between Beccles and Ipswich before the day of the collision. Nothing unusual occurred between Lowestoft and Beccles, and we left Beccles with 140 lbs. of steam. No one but the driver and myself were on the engine. We began to lose speed at the third gate-house from this, and the speed gradually decreased till we came to a dead stand near the top of the bank. The gauge still showed 140 lbs. when we stopped, and the engine was blowing off. My mate then told me to go back and tell the guard to uncouple half the train. I ran back about half the train and called out to the guard, but he did not hear me, and I then myself uncoupled the train—leaving 11 trucks attached to the engine—without communicating with the guard. I then went back to the engine but did not hear or see the rear portion get into motion before I reached it. I then said to the driver, "All right mate, I have uncoupled half of them." The driver then had to set back a little before moving ahead; I cannot say how much because I was coaling. I looked back after starting, but was not aware that the rear half of the train was in motion backward, and I did not know that it had gone back till we had returned from Brampton on the wrong line, when we found them gone and proceeded on to Beccles. I have had the new rule book, but was not aware there was a rule applying to the present case. The guard told me the same day at Saxmundham that he had seen me coming back. I concluded that he knew I was uncoupling the train, and I was anxious to save time.

7. *Henry Bird*, goods guard nearly eight years.—I am well acquainted with the line between Beccles and Ipswich. I left Lowestoft with a sand train for Stratford at 8.20 a.m. on the 25th with a load of 24 loaded sand trucks and a break-van (weighing 6 tons). There is an understanding that 25 trucks of sand is the limit of load for a first-class engine. We had had on 25 trucks before starting, but there being something wrong with one of the trucks, it was detached. All went right as far as Beccles, from which we started after a delay of 17 minutes, consumed in greasing the wheels, &c., leaving at 9.5. I was alone in the van. We got on very well at a speed of about 10 miles an hour till we passed the London Road crossing, when the speed seemed to slacken all of a sudden and we then gradually came to a stand with the engine near the next gate-house on a slope of 1 in 66. As soon as we stopped I put my break fast on and chained it. I then found that the driver was immediately setting back to ease the couplings. I looked out on the near side and saw the fireman coming back, and immediately went into the break, tore a leaf out of my book, and commenced writing instructions for the driver to proceed and come back on the wrong road in accordance with rules 216 and 283. While I was doing this I felt a jerk back; I at once jumped out into the 6-foot space and saw the fireman going towards the engine, and the rear part of the train in motion backwards. I rushed into the break, got a sprag and put it

into the rear wheel of the truck next the break. It kept in but did not stop the motion of the train. On finding this, I again went back into the van and got a second sprag, but could not manage to put it in, as the train was beginning to move back too fast. I then threw it on to the third truck from the van, and jumped onto the truck, and from it got back into the van. There were no breaks on any of the trucks. The speed when I jumped into the third truck was about 10 miles an hour. I could not have overtaken my van by running. The trucks seemed to gather speed all at once. I then shouted to some platelayers to put ballast on the rails, they did so, but without apparent effect, and then again to another gang, who did the same, also without effect. The speed increased to 12 or 15 miles an hour, and did not seem to moderate when we reached the gentler gradient. I got on to the top of the van coming round the curve into Beccles hoping to attract some one's attention, and I believe a platelayer and a gateman saw me, and the

former ran towards the station, but we passed him. I jumped out on the near side near the cross-over road. I kept my feet with difficulty, and did not hurt myself. Had the fireman come back to me I should have put two sprags in before the front portion of the train started. My van wheels skidded and continued to do so all the way down.

8. *Samuel Shirt*, gateman four years at Cromwell Lane, about 50 yards from where the train came to a stand.—I told the driver he had better uncouple and go to Bampton. He then turned round and told his fireman to go and uncouple, but I never heard the guard's name mentioned. The fireman gave a signal to ease back, which the driver did and the fireman then uncoupled. The fireman then came back and the driver reversed before setting forward, and had just gone ahead before the rear portion had got into backward motion.

Conclusion.

This collision between 13 runaway sand trucks and a break-van and the carriages of an excursion train (from which the engine had been fortunately detached), was caused by the driver and fireman of the sand train not attending to a rule specially framed for their guidance under the circumstances in which they were placed. The rule is as follows: "When a portion of a train is left upon the main line from accident or inability of the engine to take the whole forward, the engine-driver must not return for it on the same line, except by written instructions from the guard, but must go on the proper line and cross at the nearest points behind the part left, which he must push before him till convenient to go in front again with the engine. If the engine-driver finds it necessary to return to the rear portion of his train on the same line, he must, before starting with the front portion, send his fireman back to the guard to obtain the necessary written instructions authorising him to do so; and if he give such instructions the guard must continue to protect his train in the rear, and prevent a following train pushing it ahead. When there is only one guard with the train, it is the duty of the fireman to ride upon the last vehicle of the front portion of the train until it is placed in a siding; and it is the duty of the guard after putting down his break, and carefully leaving the last portion of the train so that it will remain stationary, to go back and take the necessary steps for protecting it by signals."

Nothing can be plainer than this rule, and had it been attended to in the present instance the train would not have been uncoupled till the guard had properly secured the rear portion by his break and sprags; whereas by the fireman uncoupling as he did without first communicating with the guard, the rear waggons ran back upon the van, overcame its break resistance and set it in motion; and although the guard appears to have done all in his power to arrest the progress of the rear portion of the train, he was unable to control it, and it ran back with increasing velocity on the gradient of 1 in 88 until the gentler gradient of 1 in 133 was reached, which latter, combined with the curve, prevented the speed being more than probably about 15 miles an hour when the collision occurred.

The ignorance displayed in this case by the driver of an important rule issued for his special guidance, raises the question as to what means are taken to insure that his servants of companies have a reasonable acquaintance with the rules with which they are supplied. The mere possession of a rule book is useless unless means are taken to insure that its contents are fairly understood.

The locomotive superintendent of the Great Eastern Railway informs me that he allows no fireman to be promoted to the post of driver unless he has previously satisfied his superior officers that he has a fair knowledge of the rules under which he works; and that although Driver Waller had unfortunately forgotten the rule in question, he had undergone an examination before his promotion.

It is not right that on a line of bad gradients a heavy train should be provided with such a light break-van as the one, weighing only six tons, attached to this sand train. Under similar circumstances two break-vans are employed by some railway companies.

Had the working of the points and signals at the south end of Beccles station been concentrated in a cabin, it is probable that the collision might have been avoided, as the signalman would then most likely have seen the runaway trucks approaching, and

have been able to turn them into the siding adjoining the up line; and it might be well to let these siding points in their normal position lie open for the siding, so that any future runaways might be intercepted before the station and junction are reached.

I have, &c.,

The Secretary,
(Railway Department), Board of Trade.

C. S. HUTCHINSON,
Major-General R.E.

Printed copies of the above report were sent to the Company on the 12th September.

GREAT EASTERN RAILWAY.

Board of Trade, (Railway Department,)

31st August 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 6th instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 5th instant, at Stepney junction, on the Great Eastern Railway.

In this case, as the 9.2 a.m. Great Eastern Company's up passenger train from Woolwich to Fenchurch Street, due at Stepney at 9.26 a.m., was crossing the down line at Stepney junction, it came into collision with the 9.22 a.m. London, Tilbury, and Southend Company's down special passenger train from Fenchurch Street to Southend, due at Stepney at 9.28 a.m.

Twenty-four passengers have complained of injury, the most serious case being (it is stated) a nervous shock.

The guard of the Woolwich train and the driver of the Tilbury train were also injured.

In the Woolwich train the three rear vehicles were thrown off the rails and damaged.

In the Southend train the engine, tender, and four front vehicles were thrown off the rails and damaged, the van having mounted the tender, and the two carriages next it having been thrown over on their right sides.

Description.

At Stepney junction the original Blackwall Railway is joined by the railway to and from Woolwich, Bow, &c., the latter being called the main line. From Stepney junction to Fenchurch Street there is a third line of rails on the north of the up and down lines, this third line being used exclusively for up traffic from the main line, there being facing points on the up line at the west end of Stepney platform by which up main line trains are turned either to the proper up line or to the third up line. In consequence of the existence of this third up line, all main line down trains and main line up trains using the third line have to cross each other's path close to the western end of Stepney platform, and it was at this crossing that the present collision occurred.

The point and signal levers are concentrated and interlocked in a raised cabin on the north side of the line close to the western end of the station, in which cabin there are 18 working levers. The only signal to which it is necessary to refer is the down home-signal (No. 18) for the main line. This is the top signal on a 2-armed post 105 yards west of the down facing points and on the north side of line, and 109 yards from the point of collision.

The main line curves from the junction sharply towards the north, the up and down platforms being on this curve.

The gradients on the main line are very slight, but to the east of the junction the Blackwall line falls sharply towards Blackwall, and is covered over with an arcade to prevent sparks from falling on to the shipping in the Regent's Canal dock, over which the line passes. The roof of this arcade is so low that the funnels of ordinary locomotive engines will not pass under it, and special engines with low funnels have to be used in consequence for the Blackwall traffic.

The line is worked on the absolute block system as regards following trains, the adjacent block cabins being Devonport Street, on the London side, about 600 yards

distant; Salmon's Lane, the same distance on the Woolwich side; and Limehouse, on the Blackwall side, about three quarters of a mile distant.

Stepney junction is an exceedingly busy place. At the present time 518 trains of all kinds pass during the 24 hours, and of these the larger portion (about 500 trains) pass during the 16 hours from 7 a.m. to 11 p.m., an average of about one every two minutes.

The Great Eastern Company supply the engines, drivers, and firemen for working the Tilbury Company's traffic.

Evidence.

1. *Thomas Webber*, Great Eastern Company's driver 20 years.—I started from North Woolwich with the 9.2 a.m. train for Fenchurch Street. We left punctually, and arrived at Stepney at 9.25 a.m., right time. We had been checked by signal nowhere to speak of. Fireman Wood was alone with me on the engine, No. 154, an 8-wheeled tank-engine, running chimney first. We had on only the ordinary break, applying to six blocks, one on each of the six rear wheels. I stopped about one minute at Stepney junction, the up-signal having been taken off just as I stopped, to allow me to proceed to the up right-hand (or third) line. The Woolwich trains never in their regular course take the up left-hand line. I started, upon the guard whistling and giving me a hand-signal. As soon as I had run clear of the signal-cabin I saw the Southend train approaching on the down line with the top signal down for it; it was hanging down perhaps not quite so low as usual, but enough to justify a driver in taking it as off for him; it would hardly have been a clear green light by night. I said to my mate, "Put down sand;" and I put on all the steam I could with the hope of getting clear of the crossing. At this time the Southend train had not quite reached the points, and my mate said it would take the down Blackwall line. I think the two engines passed each other between the down home-signal post and the crossing. I did not notice what the driver of the Southend train was doing. I had no time to whistle myself nor did I hear the Southend driver do so. I had on nine vehicles, and the Southend engine struck the seventh of these. I had drawn six clear of the crossing. None of the couplings gave way in my train. The train stopped dead, but neither I nor the fireman was hurt. The damage was confined to the three rear vehicles; the down signal for the Southend train remained hanging down in the same position for 20 minutes after the collision, and was seen in that position by a signal-fitter and others. I had never seen this signal improperly off before.

2. *Abraham Wood*, fireman two years, and for 12 months working regularly with Webber.—All went right on the journey as far as Stepney, where the starting-signal for the up right-hand line was taken off just before we started. We started after the usual stop, and as soon as we had cleared the signal-cabin I saw a down Southend train coming and not drawing up at the down signal-post, where I also saw the top arm down, though not quite so much as is usual, but it was quite low enough for me to have taken it as a proper signal to proceed. My mate shouted to me to put down sand, and he put on all the steam he could. I did as he said, and the two engines passed each other about two engines' lengths on the London side of the facing-points. I then turned round and looked to see the position of the facing-points on the down line, and saw them lying right for Blackwall, and said, "It is all right, mate; he is letting them down the Blackwall road." I then looked forward again, and was not aware the points had been shifted, till I felt the Southend engine strike the tail of my train. The blow pretty well stopped us, and I at once put on my break and the driver shut off steam. The down-signal remained in the same position for some time after the collision.

3. *Alfred Read*, guard five years with the Great Eastern Company.—The up Woolwich train consisted on the day in question of nine vehicles, including a break-van next the engine, and a carriage break in rear in which I was riding alone. All went right up to Stepney, which we left a minute late, viz., at 9.27. I saw the signal off for the right-hand up line before we started, but I cannot say when it was put back to danger. I was not aware that the Southend train had been turned across our road till its engine struck us. I had felt the driver starting more quickly than usual, but without knowing why. I was knocked down in my break and hurt in the shoulder and hip, and was off duty a week. After the collision my driver drew my attention to the down signal for the main line, and it was hanging in such a position that any driver might have taken it for an ordinary junction-signal when lowered. I think it would have shewn a green light by night.

4. *George Bickmore*, Great Eastern Company's driver 15 years.—I have been engaged in working the Tilbury traffic for the whole of this time. I was driving a special train from Fenchurch Street to Southend, which started at 9.22 a.m., two minutes late. My engine was a 4-coupled engine and tender, running engine first. There was the ordinary break on the 4-wheeled tender, and no continuous break. The train consisted altogether of 14 vehicles. We had a clear run from Fenchurch Street, and I first got sight of the Stepney junction-signals when passing Shadwell station, the top arm on the home-signal post was then hanging in the position of "caution;" it might not have been hanging quite so low as usual, but quite low enough to justify its being taken as a "clear" signal. The Devonport home-signal which acts as a distant-signal from Stepney junction was also at "caution." I had to stop at Stepney, and was close on to the down home-signal-post, when I saw the Woolwich train coming out of the station and crossing on to the right-hand up line. My speed at this time was about 8 to 10 miles an hour, the usual speed for stopping at Stepney. I then looked to see how the facing-points were lying, and finding they were lying right for the Blackwall line, thought that I should only overrun a little and have to set back, but should not strike the Woolwich train. This rather took off my attention from endeavouring to stop, though my break had been on at the time for 200 or 300 yards back, and steam had been shut off at Shadwell. I did not see the facing-points shifted, but I felt the engine take the main line, and it was then too late to do anything, for I was at once thrown forward against the fire-box, and my mate on the top of me. The engine at once left the road and ran on as far as the end of the platform. The centre coupling between the engine and tender broke. I got badly shaken and bruised. I tried to resume work, but had to give it up and start again to-morrow. I have never before this known the down home main line signal improperly off. On seeing the facing-points lying for Blackwall, I remarked to my mate, "Why, he is going to let us down the Blackwall line," and it struck me something must be wrong.

5. *Henry Hale*, fireman 4 years, nearly the whole

of the time with Bickmore.—I was on the left-hand side of the engine as we were approaching Stepney junction on the day of the collision. When passing through Shadwell I noticed the top arm of the Stepney junction down signal-post in about the usual position for a "clear" signal, though it may have been a shade higher. It would certainly have shown a green light by night. Steam was shut off on passing Shadwell about the usual place, and I applied my break in the customary way when near the home-signal-post, the signal arm still remaining in the same position. About 20 yards on the Stepney side of the signal-post, when our speed was perhaps 9 or 10 miles an hour, my mate called out, "Where is the fellow turning us to, the points are right for the Blackwall road." I then myself looked and saw the points lying for the Blackwall road, and immediately afterwards saw the Woolwich train. I made a rush at my break to put it on a little harder on seeing that we were going down the Blackwall road; and while in the act of doing so, the points must have been shifted, and we came into collision with the Woolwich train, and I was thrown against my mate. I was a little hurt from the coal falling off the tender, but have not had to leave work. I have never before known this signal act improperly.

6. *Thomas Murrell*, guard two years in the service of the London, Tilbury, and Southend Company.—I was in charge of the special train from Fenchurch Street to Southend on the 5th inst. It consisted of 14 vehicles, including two carriage breaks, one front and one rear. I was in the rear break, in which there were also by necessity some passengers with fish. We started at 9.23, three minutes late. The train was quite full. On going through Shadwell I saw the down home-signal at Stepney (the top arm) in the usual position for a train to proceed. I also took further notice of it at Devonport Street, when it remained in the same position. I think it would have shown a green light by night. Before the tail of the train had reached the signal-post I had my break fully on, and felt the break-carriage move backwards and forwards and then come to a stand. I was not hurt. This was about 9.28 a.m. I believe that only the three front vehicles left the rails. Our speed was not more than eight or nine miles an hour when we were stopped.

7. *William Hampshire*, guard two months at the time of the collision in the London, Tilbury, and Southend Company's service.—I was riding in the front break-carriage of the excursion train. I noticed as we passed Shadwell the top arm of the home-signal post at Stepney was hanging off quite enough to justify a driver taking it as off, though perhaps not quite so low as usual. I had no misgivings about it. It remained in this position till we came to it. I put on my break slightly for stopping at the station, just before reaching the signal. Just after passing the signal I saw the Woolwich train crossing to the right-hand up line and applied my break harder, and I was at my break-handle when we struck at a speed of about four or five miles an hour. The break mounted the top of the tender, and I slipped down on one knee and was slightly hurt, but had not to leave duty. I noticed 10 minutes after the collision the signal still in the same position as when we passed it.

8. *William Stephens*, signalman 2½ years in the Great Eastern Company's service; 10½ months at Stepney junction, where I came on duty at 6 a.m. on the 5th for an 8 hours spell.—I work absolute block between Devonport Street on both the up lines and the down line, and also between Salmon's Lane and Limehouse. I keep no train register. The Woolwich up train was signalled on to me about 9.26 from Salmon's Lane. I accepted the train and it duly arrived at Stepney.

While the Woolwich train was standing in the station, at about 9.27, I received the signal for the down Southend train, which I also accepted, but I never had the slightest intention of letting it cross on to the down main line before the Woolwich train had gone. The last down train previously to the Southend train had been a Bow train, which had passed about 9.25. The home-signal had been lowered for this train and it had a clear run into the station. Immediately it had passed the facing-points, I had put back the home-signal lever into the position of "danger," but I had not at the time looked to see whether the signal-arm had obeyed the lever, and gone back to "danger." I have no recollection of having put it back more slowly than usual. After the Bow train had arrived I set the points for the Woolwich train to cross to the right-hand up road, and lowered the starting-signal for that road. As soon as the Woolwich train had started and the tail of it passed the points, I put back the starting-signal to "danger," and turned round to look at the Woolwich train as it passed, to see if anything was wrong, and then saw the Southend train between the down signal-post and the down facing-points, but nearer to the signal. I had expected it to be standing at or approaching the signal-post. On then looking at the home-signal, I saw it hanging three parts off towards "caution" instead of being at "danger." I considered for the moment what to do, and thinking the Woolwich train would have cleared the crossing, I decided to pull over the facing-points for the main down line, instead of allowing the Southend train to go down the Blackwall line. I had just time to do this, and turned the Southend train on to the main down line. Another reason I had for not wishing to let the Southend train run upon the Blackwall line was the knowledge that the engine might strike the roof of an arcade, about 180 yards from the junction, over the Regent's Canal dock, the Blackwall engines having specially low funnels. I had waved a red flag to the driver of the Southend train directly I noticed him passing the signal, but I do not think he could see it on account of the smoke and steam from the Woolwich engine. The collision then took place—at 9.27 or 9.28. I have not the slightest idea why the signal-arm did not go back to "danger" when I put the lever back. I had never known it stick before. There was an up train also standing at this time on the Blackwall up line, for which I had lowered the starting-signal. I did not ascertain after the collision why the signal had stuck.

9. *William Beer*, signal-fitter in the Great Eastern Company's service, in charge of the signals on the Blackwall line.—I arrived at Stepney about quarter-past 10 a.m. on the 5th. The down main line signal was at "danger" when I arrived. I was told it had been improperly off, but I could not ascertain why this had been. It was then acting quite properly. I was told that some bricks which had been brought down by the collision had been lying on the wire. I have since added a little to the weight at the bottom. Two or three months since the arm had been renewed, but the new arm was lighter than the old one.

10. *John Pratt*, assistant signal-fitter on the Blackwall line.—I happened to be at Stepney when the collision occurred. I heard it take place. About five minutes after driver Webber drew my attention to the down home main line signal, which was about half way down to "caution." At this time there were bricks and wood on the wire sufficient to draw it into the position in which it was. I helped to remove those things, and the signal then went properly to "danger." I made no further endeavours to see why it had failed, and could see no reason for it. The wire was not at all tight.

Conclusion.

This serious collision between two passenger trains on the crossing of the up third line and down main line at Stepney junction was caused partly by the failure of the down home main line signal arm to return to danger, after it had been taken off to allow a main line down train to pass two minutes previously; the junction signalman then having put back the lever into the position of "danger," prior to lowering the up home-signal for a train to proceed to the up third line: and partly by the action of the same signalman, who, upon seeing that the down home main line signal-arm was showing "clear" when it ought to have been at "danger," and that the down main line train was rapidly approaching it, imprudently shifted the facing-points on the down line, by doing which he turned the down train across the path of the up train, the engine of the former striking the third vehicle from the rear of the latter. Had the signalman left the facing-points alone, no collision would have happened, and the down train would have been merely turned on to the Blackwall line. He states that his reason for moving the points was that he thought there would have been just time for the up train to have cleared the crossing before the down train reached it, and that he was afraid of allowing the down train to run on to the Blackwall line in consequence of the danger to be apprehended from the funnel of the main line engine striking the low roof of the arcade over the Regent's Canal dock, the engines of the Blackwall trains having specially low funnels on account of this roof. He, no doubt, acted with the best intentions, but he would have been wiser to have let the points alone. He is, moreover, to be blamed for not having seen that the down home main line signal-arm obeyed the motion of the lever when he put it into the position of "danger," though at the same time, considering the exceedingly rapid traffic at the junction (a train every two minutes on an average, and sometimes three together), it is not to be wondered at if a signalman occasionally omits the important duty of seeing that the signal-arms move with the levers.

The signal which failed on this occasion had not been known to do so on any previous occasion, and I could not ascertain the cause of its having stuck in the post in the present instance. Since the collision it has been provided with some additional weight. It is worked with wire; but it is well worthy of consideration whether, to insure as far as possible the accurate working of (especially junction) home-signals, it would not be wise to substitute rods for wire.

With regard to the prevention of the recurrence of a similar collision, it is a question how far it might be expedient to alter the running on the lines between Stepney and Fenchurch Street. At present the up third line and down main line trains cross each other's paths at Stepney junction; this might be obviated by converting the present down line into an up line, and the present third up line into the down line. On the other hand, the suggested alteration would stop the up main line traffic when any down Blackwall train was crossing the junction, whereas now a down Blackwall train and up third line train can run together. If, however, the proposed alteration could be effected without undue interference with the running of the traffic at the junction, it would certainly tend to contribute to safety both at Stepney Junction and Fenchurch Street. If it is found necessary to leave things as they are, it would be an improvement to work the facing-points (Nos. 9 and 11) with the same lever; this would render a recurrence of a similar collision very improbable.

It would also be desirable that *all* trains or engines should be ordered to stop at Stepney Junction.

Continuous breaks in the hands of the driver of the Tilbury train would have been useful in this case, as they would have enabled him to have stopped at once on seeing that he was being turned on to the Blackwall line.

The existence of the low arcade on the Blackwall line, which, no doubt, may have influenced the signalman in deciding to reverse the facing-points, is an obstruction to the freedom of traffic, and consequently a source of danger which early means should be taken to remedy.

I have, &c.

The Secretary,
(Railway Department,) Board of Trade.

C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Great Eastern and the London, Tilbury, and Southend Railway Companies on the 5th October.

GREAT NORTHERN RAILWAY.

Board of Trade, (Railway Department,)

13, Downing Street, 8th July 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 24th ultimo, the result of my inquiry into the circumstances which attended an accident that occurred on Sunday the 23rd ultimo, to the 5.0 p.m. Great Northern passenger train from Shipley to Bradford.

Eleven passengers complained at the time of having been injured, some of them apparently seriously, and seven or eight others have since stated that they were hurt, and four of the company's servants were also injured; the driver and fireman so much so that neither were able to attend at my inquiry.

The tank engine had its frame broken, boiler cover and roof over foot-plate damaged. The leading carriage fitted with a break was broken up: that next to it had its end knocked in, and the two next carriages were each damaged at one end.

In this case the engine and the whole of the carriages in the train got off the rails to the left, on the outside of the curve, immediately after passing over the facing-points at Quarry Gap junction on the Laister Dyke extension of the Great Northern Railway; the engine after running some short distance off the rails swerved round and fell over on its side with its chimney towards the direction from whence it had come; the carriage next to the engine became detached from it and ran some distance beyond where the engine stopped, and finally fell on its side into a quarry hole about 8 feet deep, nearly 120 yards beyond the heel of the switches. The next carriage was twisted round and partly rested on the preceding carriage lying in the quarry hole.

The road was partly destroyed; some rails were bent, 38 intermediate chairs, and 5 crossing chairs, 1 locking-bar, and 50 fish bolts were broken, 12 sleepers were damaged. A goods line signal-post and a flagman's hut were knocked down and broken by the engine while running off the rails coming against them.

Evidence.

Thomas Tilley, signalman at Quarry junction signal-box, states: I was on duty on Sunday the 23rd instant, and went on duty at 7.0 a.m. I had my points set for the 5.0 p.m. train from Shipley to Bradford to go into Laister Dyke station. The train was signalled from Shipley as follows: "be ready" 5.0 p.m., "train on line" 5.4 p.m. The train is due to leave Shipley at 5.0 p.m. As soon as I received "train on line" from Shipley I sent the "be ready" to Laister Dyke east box, the signalman there accepted the "be ready" at 5.4 p.m., and I gave "line clear" at the same time. I dropped my signals about 5.5 p.m. for this train, and as my signals were off, the driver did not whistle before passing over the junction. I could see the train approaching before it passed the distant-signal, the steam was shut off. I did not see steam put on again, either after passing the distant-signal, or before or after passing the same signal. I did not keep my eye fixed on the train all the way, and cannot say for certain whether steam was applied or not. I cannot say at what speed the train passed my box, but I should say from 10 to 15 miles an hour: the usual speed, nearer 15 than 10 I think: the speed was not excessive. The train passed my box at 5.22 p.m. I booked the time as the train passed my box. The train is due to leave Laister Dyke at 5.20 p.m. The points had not been worked from 7.0 a.m. up to the time when the accident occurred, and they were in their normal position all day: I did not hear any whistling for the guard's break: I do not know whether the vacuum break was applied or not. When the engine was on the down fork, just about between the line of the up and down lines of the Cutlers junction branch, I heard a noise as of wheels striking something, and I looked and saw the carriages leaving the rails:

I could not see the engine for the break-van and for steam.

William Houseman, guard four years, states: I was in charge of No. 33 passenger train, Shipley to Bradford, on Sunday the 23rd instant, and rode in the last vehicle, a third-class carriage break: David Ginn, breaksman, was in the first vehicle (a third-class carriage break) next the engine. The train consisted of a tank engine, No. 504, with eight wheels and bogie frame, and eight carriages. The train was fitted up throughout with the vacuum break, which worked all right. It was first applied before approaching Quarry Gap junction, after leaving Eccles-hill, at or near the advanced signal-post for the down line, and it worked all right: the signals at Quarry Gap junction were all off for my train to proceed: the vacuum break was again applied about 50 yards before reaching the junction: the steam was shut off at the over-bridge, carrying the Leeds and Bradford turnpike road over the railway: it was not again applied: we left Shipley at 5.1 p.m., and were two minutes late at Quarry Gap junction. The train was running at caution from 10 to 15 miles an hour. I was looking out of my van on the 6-foot side, when I saw the engine oscillate as it passed over the lines leading to Cutlers junction, and left the rails directly afterwards. I tried to apply my break, but was knocked down in my van, and was somewhat bruised: I felt the van jump off the road, and it stopped dead about 10 yards after passing over the line leading from Cutlers junction, and it did not run quite as far as where the engine lay: I gathered myself up and went to the front to see what was amiss: the front van went into a hole by the side of the line, out of which stones are being got, and fell on to its broad

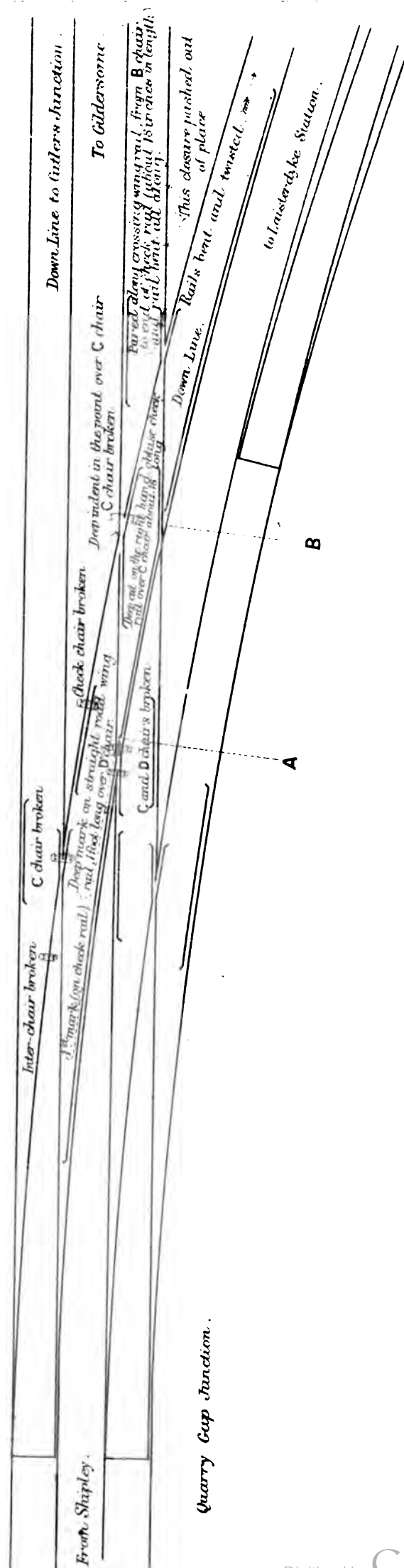
GREAT NORTHERN RAILWAY

QUARRY GAP JUNCTION

IDLE AND SHIPLEY BRANCH.

Plan showing the broken chairs and wheel marks caused by Train running off

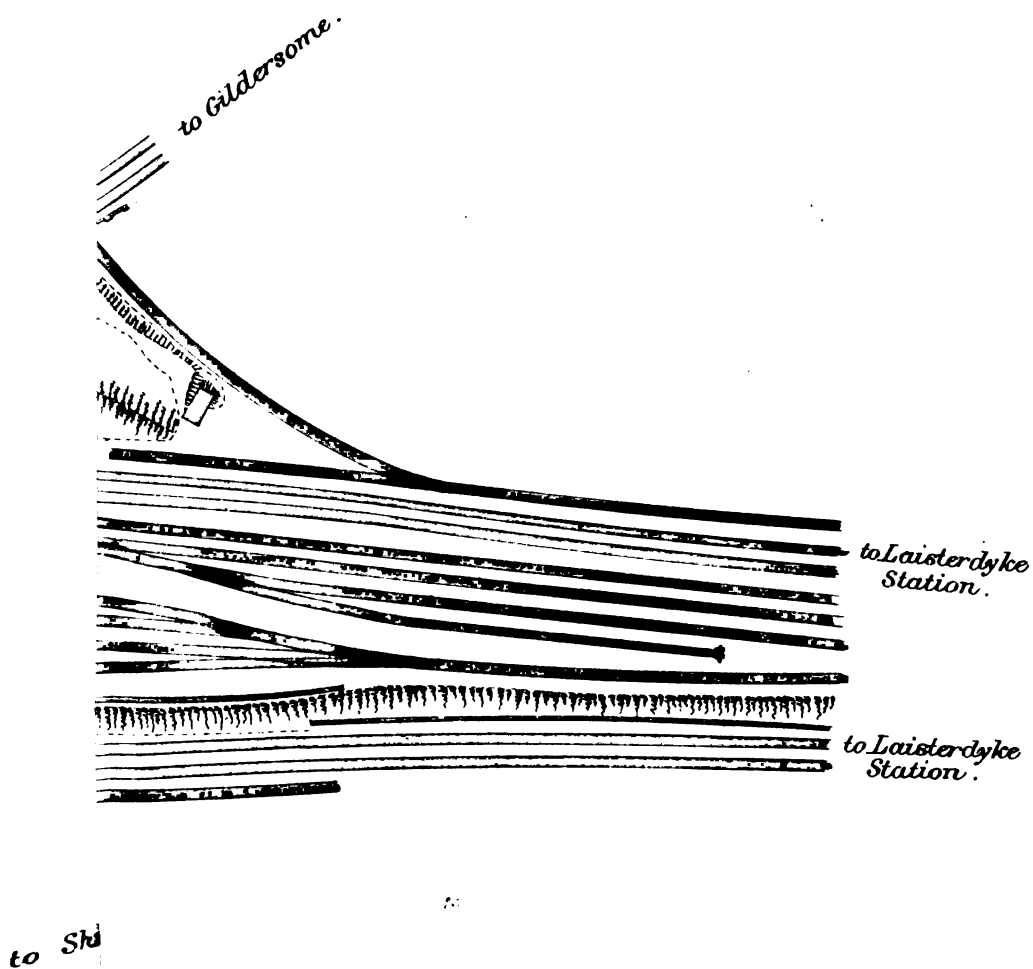
Road on June 23rd 1878.



Scale. 16 Feet to an Inch.

*To accompany Colonel Yolland's Report.
Dated 8th July 1878.*

23rd 1878.



side: the next carriage was across the end of the former carriage: the rest were all off the road, but all the vehicles were upright, except the one in the quarry hole. I afterwards saw the engine in the angle between the two lines, lying on its broadside, and turned quite round. There was no signal from the driver that anything was wrong, and there was no time to do anything: I first assisted the passengers out of the carriage which was down in the quarry; many complained of being hurt, and some had to be assisted out. Breaksman Ginn was amongst the injured: I distinctly felt the vacuum break applied, and it took effect. It is usual to apply the vacuum break at or about the same place. I went forward immediately after the accident and found the driver at his engine, as if he hardly knew what he was about: the stoker appeared to be badly hurt. The front break-carriage was separated from the tank engine in front and from the carriage behind it, and the second carriage was separated from the rest of the train, which remained all coupled together and standing upright, but off the rails: we were travelling slower than we have done at times past that junction: I was hurt in the back, arm, and in one leg, and am not able as yet to return to my duty. It was 22 minutes past 5 o'clock when I looked at my watch, after the accident had happened, when I was going ahead to the driver. There were several passengers who were bleeding very much about the face; I took down the names of nine, besides the driver and fireman of the train: the passengers who were injured were mostly in the first carriage break. I saw the driver apply the vacuum break twice before he came to the junction—the last time about 50 yards before reaching the junction, and I felt the action of the break.

Thomas Taylor foreman-platelayer, states: I reached the scene of the accident about 6 o'clock: I found some broken chairs and bent rails caused by the accident. I examined the switches and crossings and found them all correct to gauge. I saw nothing wrong with the road likely to cause the accident: I went over the road in the morning about 9 o'clock, and it then appeared all right. After the accident the road was not repaired, or anything done to it until after Inspector Baines arrived. I saw marks on the rails, as if something had mounted the rails: this was at the obtuse crossing marked B, a rail was also broken and bent in the left-hand running line from Cutlers junction. The first chair that was broken was in the left rail as a check in the second crossing, there was no other broken chair further back than the obtuse crossing marked B. The first mark on the rails was at the second crossing on the right rail. This mark was on the right side of the right rail, there was a cut on the outside of the rail, and it must have been done by a wheel off the rails: there was about $1\frac{1}{2}$ inch of cant at the first crossing as tried by a level: I tried it myself. There were no keys out: some rails were bent, but none were broken.

Joseph C. Baines, inspector of permanent way, states: I reached the scene of the accident about 8.10 p.m. I found the whole of the train off the road, and the engine turned round and on its side, the latter was in the angle between the two junctions, it was lying on a heap of stones about 60 yards from the points. The signal-post for the goods through road had been struck I think by the engine, and knocked down. I found the road had a slight mark on the top of the check-rail right hand, between the running lines, next the 6-ft. way. After passing the facing-points, the next thing I noticed was a severe cut in the wing rail of the second acute crossing marked "A," the next mark I noticed was on the check-rail of the right hand obtuse crossing marked "B:" the line has a check-rail for some distance here, the flange of some vehicle or engine appeared to have mounted the middle rails, i.e., the rails in the fork line from Cutlers junction, and caught the next check-rail running over the end of the latter,

and dropped off the road: the left side wheel struck the left wing of the far acute crossing, and slid along to the end of the V rail, and forced the short closure and pushed out and bent the latter (about 8 or 9 feet long), on the running line of rails: four long rails were much bent and twisted, and 38 intermediate and five crossing chairs were broken: the facing-point locking-bar leading to the goods yard was also broken and the goods yard signal-post and fogman's hut were run against by the engine, knocked down, and broken. I had not received any instructions to alter the road yesterday and the day before, between A and the facing-points. The curve between the switches and the first crossing on the left rail was sharper than it was further on, and in consequence I substituted a flatter crossing at this first crossing in order to make it flatter, easier. I thought it might be one month or two before the Government Inspector might come, and I thought that if the trains were run round that curve at the speed at which I have seen trains run they might come off again: I don't think that curve should be run over at a greater speed than 10 miles an hour, and as far as my judgment goes I have seen them running round it at 20 miles an hour. I tried the gauge and found the gauge correct all round through the crossings $\frac{1}{4}$ inch tight and 4 ft. $8\frac{1}{4}$ inches at other parts. I did not try the cant that night, and not until the next morning. It was $1\frac{1}{8}$ -inch at the first crossing and about $\frac{1}{2}$ inch between the crossing and the points. In my opinion the road at that part was dangerous at the speed at which I have seen trains run round it. There have not been any previous accidents at this spot, and it has been in the same state for three or four years, except that the check-rail has been extended since the Barkstone accident.

David Ginn, under guard of the 5.0 p.m. train from Shipley on Sunday 23rd June, states: I rode in the front break-carriage; the train was fitted with Smith's vacuum break throughout. I do not know when we left Shipley. We stopped at all stations (3), and as we approached Quarry Gap junction, the signals were all right: I have been breaksman 18 months, and I have run on this branch for that time: I think we were running about our usual rate, nearly 15 miles an hour, the steam was off: I was on the look-out ahead: I first saw the engine jump: it had passed the points at that time, and the jump took place at the crossing of the down fork or branch, by the line on which we were running, or at B: that the carriage in which I was riding got off at that spot: that this carriage got off the rails to the left, and fell down into the quarry hole: I think there were about seven passengers in that carriage, but not in the break compartment. I fell with the carriage, and was hurt in the back. I do not know at what time the accident happened. The vacuum break was applied two or three times as it approached the junction and that is generally done. I cannot say whether we had nearly stopped when my carriage (834) fell over on its side: it was very much damaged.

Thomas Walker, station-master Laister Dyke, states: I was on the spot very shortly after the accident occurred. I found the train off the line as described by Guard Houseman, and others, and the engine on its broad side. I examined the line and found the facing-points all right. I then examined the rails, and found the end of the check-rail No. 1, nearest the point, had been struck very hard by something: a little further on, a short distance from the end of the same rail, there was the mark as if the flange of a wheel had passed along the top. I found other marks at different places; the rail at "C" was also bent, and out of its place.

Matthew George Foreman, in the locomotive department stationed at Bradford, states: I got to the scene of the accident about 6.30 p.m. with a

breakdown gang: the engine was in good order. I found it with the wheels uppermost. It was an eight-wheeled (four wheels coupled) and four on bogie frame. I believe it to have been in good order, the wheels were true to gauge. I cannot give any information as to the state of the permanent way, and cannot offer any opinion as to the cause of the accident. The men were employed on the Monday following the accident, at the first crossing from the facing-points, and they lifted it on that day, and it was right by 6 o'clock on Monday night. I did not notice anything unusual in the coupling of the carriages that all ran off the road.

As already stated the driver and fireman of the engine were too much hurt to attend at my inquiry, but the company's officers were good enough to supply me with the following written reports which these men had made on the subject to their superintendent immediately after the accident had taken place.

"Bradford, June 23rd, 1878.

"SIR,
504 Engine.
"When working No. 33 passenger-train, Shipley to Bradford, I shut the steam off in Fegley cutting; I should then be running from 25 to 30 miles per hour. I applied the vacuum when passing the distant-signal, and reduced the speed of the train from 12 to 10 miles per hour before I got to the junction. Just before entering the points I eased the

vacuum, as I do not consider it safe wheels skidding on going through facing-points, but I had not gone much further before I found the engine had left the rails. I put the vacuum on again, but it did not act. I believe the engine had become disconnected from the train. I cannot say anything further in this case, as I was so badly scalded and knocked about.

"Yours truly,

"H. BROWN."

(Engine-driver.)

"Bradford, June 23rd, 1878.

"SIR,
504 Engine.

"When working No. 33 passenger train from Shipley to Bradford, on arriving at Quarry Gap junction, I felt the engine leave the road, but I am unable to give the cause. After passing Leeds Road bridge my mate applied the vacuum, and steadied the train all the way down to the junction, where the engine left the rails; the speed we were coming over the junction was about 10 miles per hour. As soon as my mate felt the engine leap he put the vacuum on to stop the train at once. My mate always came down with the vacuum on to steady the trains in all cases. This is all the evidence I can give as regards the accident.

"Yours truly,

"E. HUMPHREY."

(Fireman.)

This branch line was authorised to be opened for traffic in April 1875, and the permanent way consisted of double-headed steel rails that weighed 80 lbs. to the yard, fixed in cast-iron chairs that each weighed 41 lbs., by outside keys; each chair being fastened to the transverse sleepers by one iron spike and two treenails; the joints of the rails were fished. The transverse sleepers were 9 feet long, by 10 inches wide, and 5 inches thick, laid at an average distance of 2 feet 8½ inches apart; the ballast of broken stone and ashes was stated to be 12 inches thick below the sleepers.

Quarry Gap junction, where the accident happened, is stated in the details supplied to the Board of Trade before the line was opened for passenger traffic to have been laid on a curve having a radius of 10 chains, and to be approached from the direction of Shipley on a rising gradient of 1 in 1,337.

The line connecting this branch line with the Gildersome branch at Cutlers junction is nearly straight, and the sharp curve with facing-points on it at Quarry Gap junction is on the line to Laister Dyke and Bradford stations.

I had not an opportunity of forming an opinion of the state of the line where the accident occurred, as the inspector of permanent way, Mr. Baines, on the day previous to my visiting the spot, had freshly spiked the chairs on the sleepers between the heel of the facing-points at the junction, and the spot where the engine and carriages got off the rails, as he was not satisfied with the nature of the curve, and desired to make it flatter and easier. What that curve may have been immediately prior to the accident I am therefore unable to say, but on trying portions of that "flatter" or "easier" curve, I found that at one part the radius of the curve was only about 8 chains, and for a shorter portion of it the radius did not exceed 6·3 chains on that part where the engine and carriages got off the line; this curve, however, was guarded by a check-rail nearly throughout its whole length, partly put in subsequent to the recent accident at Barkstone junction on the 7th December 1877.

The company's regulations authorise the drivers to run past this Quarry Gap junction at a speed of 15 miles an hour, and there is no evidence from any of the company's servants to show that the train was travelling at a greater speed. The driver and fireman estimate the speed at 10 miles an hour, but the condition and state of the train after the accident plainly indicate that the speed could not be less than 15 miles an hour, and it was probably greater. The engine which was drawing the train was an eight-wheeled tank engine, having the leading and driving wheels coupled, and the four trailing wheels on a bogie frame. It was running with the chimney in front. The diameter of the coupled wheels is 5 feet 7 inches, and that of the trailing wheels 3 feet in diameter. The distance between the centres of the leading and driving wheels is 7 feet 3 inches, that between the centres of the driving wheel and the leading wheel of the bogie is 10 feet 3 inches and

the distance between the centres of the leading and trailing wheels of the bogie is 5 feet, making up a total wheel bore of 22 feet 6 inches.

The weights when in working order on the leading wheels are stated to have been						Tons.	cwt.
-	-	-	-	-	-	11	10 $\frac{3}{4}$
"	"	"	driving	"	"	14	14
"	"	"	bogie	"	"	14	10
						Total	40 10 $\frac{3}{4}$

After the accident had occurred the engine was in such a state that the existing weights on the several wheels would probably not have been of any assistance in forming an accurate opinion as to the probable cause of the accident.

This engine commenced work in September 1873, and had run with its first tyres 119,748 miles, with twice topping, being equal to 39,916 miles for each topping. The wheels were re-tyred June 14th, 1877, and had run up to June 23rd, 1878, 34,283 miles, making a total of 154,031 miles.

The left leading spring top plate was found broken after the accident—the fracture was quite fresh, and I have no doubt was the result of the accident. The flange of the tyre of the left leading wheel of the engine was decidedly sharp, but all the wheels of the engine were stated to have been true to gauge.

According to the preceding statements, and those made on the ground by the parties concerned, and those who first arrived at the spot, who pointed out what was the state of the permanent way immediately after the accident had occurred, it appears that the first mark on the down line of anything being wrong was found on the top of the check-rail on the inner side of the curve, inside the right rail, about 14 $\frac{2}{3}$ yards from the heel of the switches. This mark is said to have been very slight, but quite distinct. An intermediate chair was found broken on a sleeper next in advance of a joint in the left or outside rail of the curve at 15 $\frac{1}{3}$ yards from the heel of the switches, or nearly opposite to the first mark on the top of the check-rail, and farther on a crossing chair was found broken under the left rail, at the crossing of the left rail of this down line on which the train was running by the right rail of the down line to Cutlers junction: a third chair under the same rail, and also holding a check-rail, was found broken about six yards further on; and at the diagonal crossing under the right rail, and nearly opposite to the last, two crossing chairs were also found broken. This crossing is marked A on the sketch which accompanies this report, and there is little doubt that the engine and some if not all of the vehicles in the train were off the rails when it passed this crossing, although more damage was done to the permanent way further on.

There is no reason for thinking that any part of the train mounted at the facing-points, and I have no doubt that the accident commenced only a short distance before the first crossing was reached, or near that part of the newly spiked line, on which I found the curves of 6.3 and 8 chains radius. I attribute the accident to the running of the train past this Quarry Gap junction at too high a rate of speed round a very sharp and not well laid-in curve, combined with the fact of the flanges of the left leading wheel of the engine having become sharp by wear.

The inspector of permanent way (Baines) pronounced that part of the road where the accident occurred "dangerous" at the speed at which he had seen trains run on it, and he named 10 miles an hour as a rate of speed that should not be exceeded. If the curve cannot be materially flattened it would be desirable to alter the regulation that exists as to the speed, and greater security would be afforded in running round such sharp curves if the check-rails were raised an inch or an inch and a half above the running rail.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 30th July.

GREAT NORTHERN RAILWAY.

Board of Trade, (Railway Department,)

13, Downing Street, 19th August 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 10th instant, the result of my inquiry into the circumstances which attended a fatal accident at Marsh Gate level-crossing, near Doncaster, on the 9th instant.

In this case a labouring man named John Costello, aged 55 years, was run over and killed on the Great Northern down main line, by a Manchester, Sheffield, and Lincolnshire goods train from Mexboro' to Marsh Gate, at 5.5 a.m.

Marsh Gate level-crossing is a little over 300 yards north of the north end of the up platform at Doncaster station, and the Great Northern main line here crosses on the level, with two lines of rails, the north-west end of one of the principal streets of the town of Doncaster, here called French Gate, which forms part of the old Great North Road, and affords the only means of access to the town from the north and west.

The crossing is provided with properly constructed gates, which close across the line, and with a wicket gate at each side of the line, at the north side of the crossing, adjoining the gatekeeper's lodge. These wickets can be bolted by levers worked from a frame at the side of the lodge, but the large gates have to be worked and bolted by hand.

The Manchester, Sheffield, and Lincolnshire Railway joins the Great Northern Railway from the west, 50 yards south of the crossing, at French Gate junction, and leaves it towards the east 120 yards north of the crossing at Marsh Gate junction, where also is the junction of the Great Northern line to Leeds.

French Gate junction cabin is 30 yards south, and Marsh Gate junction cabin 120 yards north of the crossing.

There is no control over the gates from either of these signal cabins, nor are any of the signals interlocked with the gates.

The main line is at this point nearly straight and level, and there is a good view of the crossing from all the lines.

There are sidings on both sides of the main line, the connection from the down sidings being a few yards south, and that from the up sidings a few yards north of the crossing.

The whole of these sidings have quite recently been re-arranged and re-signalled, so as to avoid as much as possible the constant shunting over this crossing which used to take place.

The following is the evidence given by servants of the Company:—

Evidence.

John Houghton, 11 months goods guard in the service of the Manchester, Sheffield, and Lincolnshire Railway Company, and 5 years guard on the London and North-Western Railway, states:—On the 9th instant I was guard of the Manchester, Sheffield, and Lincolnshire down goods train, No. 28, from Marsh Gate to Ardwick. We left Marsh Gate at 5 a.m., proper time, and proceeded on the Great Northern up main line past Marsh Gate crossing. I saw two persons standing at the east side of the line on the crossing inside the wicket gate, apparently waiting to cross. I was riding in the break-van at the rear of the train, and I was then standing in the open platform at the rear of the van, looking out towards the place where they were standing. As soon as my break-van had passed, one man attempted to cross. I called out to him to look out, because I saw a train approaching on the down line, quite close at hand. He did not seem to hear me, but went on, and was knocked down and run over by the train on the down line. He was an old man, and was walking very slowly with his head down. I had seen the same man on three previous mornings that week, waiting to cross, but he was not then inside the gates. My train was going about 9 or 10 miles an hour, and the other train must have

been going at about the same speed, as near as I can judge. The driver of the train which knocked him down whistled distinctly on approaching the crossing. I heard him when he came opposite to my break three or four waggon lengths south of the crossing. I can't say whether or not the driver of my train sounded his whistle, but he probably did so according to custom. I didn't observe any men at French Gate junction box, which is a short distance south of the crossing, nor did I hear any one shouting. I had run across to the other side of my van, to signal to the guard of the other train.

George Firth, Manchester, Sheffield, and Lincolnshire goods driver about five years, states:—On the 9th of August 1878 I was driver of a Manchester, Sheffield, and Lincolnshire up goods train from Mexboro' to Marsh Gate, Doncaster, consisting of tank engine, running coal bunker first, seven loaded and one empty goods waggons, and a break-van at the rear of the train. We are timed to leave Mexboro' at 5 a.m., but we usually leave earlier, if ready to do so, in order to get through for the North Eastern traffic. We are due at Marsh Gate at 5.30 a.m., Marsh Gate being a few hundred yards north of the

level crossing. On this morning we left Mexboro' at 4.47 a.m., and were approaching Marsh Gate crossing at 5.5 a.m. The signals had been right all through the yard. I was then running on the Great Northern down main line at about 10 miles an hour, the usual speed when the signals are right, and the regulated speed to run past Doncaster station. I sounded my whistle three or four waggon lengths south of the crossing. I saw another Manchester, Sheffield, and Lincolnshire goods train coming on the up line. The rear van of this train had cleared the crossing as I passed it (the van). My view of the east side of the crossing had been obstructed by this train. When the break-van had passed me, and the view was clear, I was only about two or three waggon lengths from the crossing, and I then for the first time saw a man crossing the line in front of me. My whistle was sounding at the time, and my mate called out to try and stop the man, putting on his break at once. I also reversed my engine, and I brought my train to a stand in about 70 yards. I was then on the left-hand side of the engine. I think it was the right side of the engine, as it was then running, which first struck the man, who was killed on the spot. I didn't see the gate-man, until I came back from where I stopped the train.

Charles Birdsall, Manchester, Sheffield, and Lincolnshire fireman four years, states:—On the 9th instant I was fireman to George Firth. I have heard his evidence and it is correct. I didn't see the gate-man at the crossing as we passed, but after we had stopped I looked back and saw him running from the direction of French Gate junction signal-box towards the crossing. He was in front of the signal-box when I saw him. The old man who was killed was walking with his head down, and not looking to one side or the other.

William Oswin, Great Northern signalman 9½ years, and nearly 7 years at French Gate junction, states:—I came on duty at French Gate junction signal-box at 10 p.m. on the 8th instant, and my tour of duty expired at 6 a.m. on the 9th instant. The rear break-van of the Manchester, Sheffield, and Lincolnshire goods train from Marsh Gate on the up main line passed my box at 5.5 a.m. Just as it was passing, and knowing that my down signals were right for another Manchester, Sheffield, and Lincolnshire goods train to Marsh Gate, which was approaching at the time, I looked round to see if the crossing was clear. I saw two men standing just inside the wicket gate on the east or up side of the line, apparently preparing to cross the line. I at once rushed to the window of my box, which was open, and called out to the men as loud as I could several times. Both of them, however, started slowly across the line. The engine of the Manchester, Sheffield, and Lincolnshire train from Mexboro' was then about 20 yards south of my box, and about 50 yards from the spot where the man was struck, just passing the van of the other train. The driver of the train from Mexboro' whistled several times, and I heard one of the men on the engine shouting. I kept on shouting to the men crossing the line, who appeared to be infirm and were walking very slowly. Neither of them seemed to pay any attention, until the one who was behind was in the 6-foot way, when he stopped quite suddenly, the engine being nearly on him. The other man was then about 1½ yards ahead, and he was knocked down and killed on the spot. As I was shouting out of my window the

gate-man, George Bygrave, rushed up to my side from the other end of the box, and began to shout too. I had seen him about four or five minutes before coming from the gates to my box, where there is an earth closet at the top of the steps. He came to my side from the direction of the closet. I have frequently seen the deceased and the other man crossing the line to their work at about the same time in the morning. I have often called out to warn them to look out. The deceased walked as if he was very infirm. I have heard he was rather deaf.

George Bygrave, gatekeeper at Marsh Gate crossing since 16th December 1877, states:—I came on duty at 10 p.m. on the 8th instant, and my tour of duty expired at 6 a.m. on the 9th instant. At about 5 a.m. I wanted to go to the closet, and I looked both ways up and down the street to see if there were any vehicles or persons coming to cross. There was nothing in either direction, so I went to the earth closet at French Gate junction box, the nearest place available. When in the closet a few minutes afterwards I heard the signalman shouting. I ran out of the closet to him in the signal box, and shouted to two men whom I saw crossing the line in front of a goods train on the down line. When I left the crossing all the signals both ways were at danger. I told the signalman, Oswin, where I was going, so that he might look out. I mean that I pointed to him as I passed to show where I was going. I can't say whether or not I spoke to him. He nodded to me, and I thought he understood me. During the night, from 7 p.m. to 7 a.m., there is only one man at the crossing. During the day there is another man to book all passing trains, and on market days and other busy days there is another man to assist in working the gates from 8 a.m. to 5 p.m. The large crossing gates are not bolted from my lodge, but there are handles working bolts to lock the wicket gates. I had not locked them before leaving the crossing on the morning of the 9th instant. None of the signals are interlocked in any way with the gates. The only rules for my guidance are the General Rules in the Company's Rule Book. There are no special rules for this crossing. There is no rule providing for what I am to do if obliged to leave the crossing. There is no rule that I am not to leave the crossing, but I know that I must not do so unless obliged to, as in this instance. I know Rule 7 in the Company's Rule Book forbids any man to leave his post. I am in frequent communication with the signalman in French Gate junction box, and I would obey any order as to working the gates which he might give me. I think he should be considered as my "superior officer," and that in letting him know I was going to the closet I was obeying Rule 7. I have left my hut before for a similar reason, and I have always told the signalman. I have frequently seen both the men passing the crossing, and I have frequently had to warn them against crossing in front of trains. I have often been abused by people for keeping the wickets bolted. I do not think I ought to bolt them when I leave the place for a few minutes. If people came in my absence to cross over and found the wickets bolted they would not like it, and would make a row.

William Oswin, being recalled, states:—The gatekeeper did sign to me where he was going when passing my box, and I nodded in reply. I knew where he was going, and kept a look-out at the crossing.

The evidence given at the coroner's inquest, which I attended two days after my inquiry, did not differ on any material point from that given above; but, from the statements of some policemen and others, it appears that the gatekeeper had been absent from his lodge, and in the signal box at least three times during the early morning of the 9th instant, and upon one occasion for some considerable time.

Conclusion.

There can be no doubt that this fatal accident was due principally to the want of caution of the poor man who was killed, but I consider that the gatekeeper should have bolted the wickets before leaving his post, so as to prevent any persons from crossing in his absence, and I consider also that the signalman at French Gate junction should be provided with some means of bolting both the main-crossing gates and the wickets from his cabin. It would be well if the levers working these bolts were interlocked with the signals in each direction, but if it be found impossible to do this, without dangerously impeding the traffic on the line, these levers would still enable the signalman to keep the crossing closed in cases of emergency, and also to exercise a real instead of a nominal control over the gates, when left, as in the present instance, in temporary charge of the crossing.

The evidence given before the coroner in this case proves that the gatekeeper was for some considerable time in the signal cabin on more than one occasion during the morning, and there is also reason to believe that this was not an unusual occurrence; he should therefore be warned that he must not on any account leave his lodge except when actually obliged to do so, and the signalman should be cautioned not to permit even servants of the Company to enter his cabin except when on duty.

Nothing that can be done, however, to improve the existing state of affairs, short of abolishing the crossing altogether, will be wholly satisfactory; so long as it remains it will be a most dangerous one, and one which would never be sanctioned at the present time. It is true that of the many accidents which have occurred here during the 35 years which have elapsed since the line was made, the present one is the first which has proved fatal, but this in my opinion merely shows that the servants of the Company have been most praiseworthy in their attention to their duties, and perhaps more than usually fortunate, for no one could stand for ten minutes on a market day and watch the stream of passengers and vehicles passing across the line without being astonished that accidents are not of very frequent occurrence. The traffic and consequent number of trains on the line is increasing from year to year, and it is worthy of the serious consideration of the Company whether it would not conduce as much to their own convenience, as it would undoubtedly to the safety of the public, to substitute an overbridge for this level-crossing, a work which presents no engineering difficulties whatever, although no doubt it would be a costly undertaking.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on the 7th September.

GREAT NORTHERN RAILWAY OF IRELAND.

SIR,

Newry, 25th November 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 3rd August last, the result of my inquiry into the circumstances connected with the collision which occurred on the 21st July, between Beragh and Omagh, on the Great Northern Railway of Ireland.

In this case, as the 8 p.m. mixed goods and passenger train from Belfast for Omagh (consisting of engine, tender, guard's van, 18 waggons, post-office van, composite carriage, and guard's van—22 vehicles in all, coupled in the order stated) was running between Beragh and Omagh, the front draw-bar of the eighth waggon was pulled out, owing to the cotter breaking; and on the front break being afterwards applied in response to the driver's whistle,—he having observed a waggon off the rails,—the rear portion of the train, which must have become somewhat separated from the front portion, overtook and ran into the latter.

Two post-office officials in the post-office van complained of having been shaken.

The second waggon (No. 308) was off the rails with all its wheels, its buffers, buffer-planks, axle-boxes, horn-plates, and right trailing spring being broken.

The seventh waggon (No. 1514) lost its front draw-bar, and had its buffer-plank broken.

Three other waggons were slightly damaged.

In the permanent-way, 23 sleepers had to be renewed, and about 100 gauge blocks.

Description.

The line between Portadown and Omagh is single, and this collision occurred near the 39th mile post from Portadown, the draw-bar of No. 1514 waggon having been picked up close to the 36 $\frac{3}{4}$ mile post from Portadown. The line falls towards Omagh on gradients of 1 in 80 to 1 in 100 for nearly the whole of this distance of 2 $\frac{1}{4}$ miles, during which the train must have been running in two portions. The curves on this part of the line are easy, not being less than 45 chains radius.

Evidence.

1. *James McGuigan*, driver two years.—I started from Belfast at 8.0 p.m., and left Beragh at about 1.55 p.m. My engine was a tender-engine, and next it came a break-van, then 18 waggons (No. 308 waggon, the third vehicle), post-office van, composite carriage, and guard's van. The train had been last examined at Portadown. Nothing unusual had occurred up to Beragh. Sparks flying from some of the wheels, which I saw on turning round to apply steam, after having had it shut off for a mile, made me suspect something was wrong; the speed was about 20 miles an hour. I at once whistled for the guard's breaks, but I did nothing myself. It was too dark for me to see what was amiss. Directly after seeing the sparks, I felt what seemed like a collision, and the engine then became detached from the van by the coupling shaking off. The engine went away from the train, which stopped without striking the engine, the latter being four or five waggons' lengths off. I put the break on when we separated. When I went back I found the front van and the first waggon on the line, but the second waggon was off, with both pair of wheels, to the left of the line, the trailing-wheels having left their seat. The right trailing spring and axle-box were partly broken away from the waggon. The front coupling was right; the front coupling chain and draw-bar of the seventh waggon, No. 1514, were gone. The second and third waggons were together when I saw them. Nothing else in the train was off the rails. I had noticed nothing unusual with No. 308 waggon previously to the accident. We first took the mails into Omagh with the van and first waggon, and then came back; and supporting the rear of No. 308 waggon on a bogie, brought it gently into Omagh, and then the remainder of the train. I had in the first instance told the fireman to put the break on, but then thought it better not to have this done, and told him not to do so. The accident occurred at 2.11 or 2.12. I saw the side lights of the van when I looked back and saw the sparks, and I had also seen these lights half-a-mile before this.

2. *Patrick McKiernan*, fireman 12 months.—I had seen the side lights of the van about three-quarters of a mile before the accident, and I have no reason to think the train had separated after this and before the accident. Directly after the front guard had put on his break, I felt the rear of the train run in upon the front waggons, and the engine then broke away from the front van; otherwise I agree with the driver's evidence.

3. *William Stewart*, goods guard.—I started from Belfast with the 8 o'clock train for Omagh. I was in the rear van. I attached No. 308 corn waggon to the train at Dungannon. No. 1514 had come from Belfast. The train had not been altered after leaving Dungannon, when No. 308 was the third vehicle, and No. 1514 the eighth vehicle. I did not notice the springs or wheels of these waggons particularly; they were loaded. No. 308 was loaded with six tons of Indian corn, and No. 1514 with general goods. Nothing unusual occurred before I felt a slight shock, previously to which I had not seen or felt anything

wrong. Our speed was about 18 miles an hour. We had left Beragh at 1.56, and the accident occurred at 2.10, the distance being about five miles. I had heard no break-whistle before the accident. After feeling the shock I put on my break, but the train had stopped before I did so. I then went up towards the engine, and found nothing wrong till I came to waggon No. 308, which was off to the left with both pairs of wheels; the front wheels were right as regards springs and boxes; the rear wheels were still under the waggon, but the right spring and axle-box were broken. No. 308 was coupled both to the waggon in front and rear of it. We then took the mails on to Omagh in the front van, and then came back for the front waggon, then for the disabled waggon, and then on coming back for the remainder of the train I found the front draw-bar gone from No. 1514, but the coupling chain was still attached to the rear of the waggon in front of it; the cotter pin must have come out of the draw-bar, and the train must have separated when the draw-bar came out, but I had not felt anything to shew that this was the case. I cannot say how No. 1514 was coupled. I was knocked off my seat by the slight collision.

4. *James Duncan*, assistant goods guard. I was in the front van of the 11.20 train from Omagh. After taking on six waggons at Dungannon, I coupled up the rest of the train, using both chains in coupling No. 1514 on to the last of the Dungannon waggons; there were no side chains. The driver whistling for the breaks was the first I knew of anything being wrong, and I was in the act of putting on my break when I felt a crash and was thrown from one side of the break to the other; the speed had then been checked a little. I could not say what the crash was from. I looked out of the window and could just see the second waggon off the rails. I had last seen the side lights of the rear van about three or four minutes before the accident. Soon after we had stopped, I found that the front draw-bar of one of the waggons was gone; a draw-bar was brought from Omagh to put in its place. Nothing else was off the rails except the second waggon from the van, of which the couplings were all right.

5. *Joseph Blaney*.—I am ganger from the 37 $\frac{1}{4}$ mile post to the 40 mile post from Portadown. The accident occurred at about the 38 $\frac{3}{4}$ mile post from Omagh. 23 sleepers were cut through close near to where the waggon stopped. The first mark of a waggon being off the road was about 50 yards behind where the first sleeper was cut through. I saw the mark on a sleeper where the draw-bar of waggon No. 1514 was picked up; this was between 36 $\frac{3}{4}$ and 37 mile post; the chain was attached to it, and the bar was entire, not hurt, but the cotter had come out. The line falls from this point to where the accident occurred. About 100 gauge blocks on the inside of the curve were broken; there are two of these blocks to a rail, 22 feet 6 inches long. The rails are flat bottomed, 71 lbs. to the yard, fastened with fang and dog spikes to cross sleepers. I found two brasses 118 yards

from the first mark on the sleepers, and a third was picked up by the 38½ mile post.

6. *George McCarsland*, carriage examiner at Omagh.—I examined the waggon 308 at about 3.30 on the 21st July. I found the right trailing spring broken, several of the short leaves gone, one end of the spring was in the ballast, and the other between the two legs of the horn-plate; part of the axle-box remained on the journal of the wheel, and the other part was gone; the couplings had not given way. A draw-bar had been pulled out of No. 1514 waggon; the cotter had, I think, given way. Waggon No. 308 was so much knocked about that I could not say what had caused the axle-box to break. The other axle-boxes were more or less broken, but the other

springs were right. The brasses seemed in good order; one remained on one of the front boxes, broken in three pieces.

7. *David McLean*, foreman packer at Belfast.—I went to Omagh on the 21st, and saw the disabled waggons. I found the leading wheels of No. 304 right to gauge, but the trailing axle was bent. The tie-rod between the left horn-plates was broken about 18 inches from the leading horn-plate, and the long part was turned round, and, I think, must have lifted the waggon sufficiently to cause the brasses to fall out. I think either the spring or the rod broke first. The pin through the centre of the spring appeared as if it had been broken before; one leaf of the spring was broken about the middle.

Conclusion.

From the foregoing evidence it appears that this somewhat curious accident and collision occurred as follows:—While the mixed train, consisting of 22 vehicles, was running down a falling gradient of 1 in 80 near the 36½ mile post from Portadown, the front draw-bar of the seventh waggon, No. 1514, forming the eighth vehicle in the train, was drawn from the waggon, by the failure of the cotter, the train being thus separated into two portions without the knowledge of any of the Company's servants in charge. About two miles further on, the driver turned round, and perceiving sparks flying from some wheels near the engine, whistled for the guard's breaks; the front guard next the engine heard the whistle, immediately began applying his break, and had slightly checked the speed, when the rear portion of the train, which must have been following the front portion very closely, ran in upon it and produced the collision, which was certainly not felt by the driver, fireman, or front guard, until after the driver had whistled on perceiving that something was wrong. After the train had come to rest it was found that the only vehicle off the rails was the second waggon, No. 308 (the third vehicle in the train); this waggon was off with all its wheels, the rear wheels having left their seat; and there was a mark on a sleeper of this vehicle having left the rails about 250 yards from the point at which the train stopped, two brasses having been picked up about 118 yards on the Portadown side of this mark.

Had the evidence not been positive as to the fact of the second waggon having been observed to be off the rails both by the driver and fireman of the train before the collision was felt (the same fact being also corroborated by the front guard's evidence), the natural conclusion would have been that it was the collision which had caused this second waggon to leave the rails; but as the case stands, it seems to be certain that, owing probably to the failure of the pin of the right trailing spring, this waggon left the rails before the collision; and on this being observed by the driver, and the front break being applied, the collision ensued, happily only slight in its consequences.

This collision affords another illustration of the danger passengers incur when travelling in mixed trains. On lines of light traffic and small financial resources the running of mixed trains may be a necessity; but it does not seem right that on a large and prosperous railway such as the Great Northern Railway of Ireland, the travelling public should be exposed to the risks unavoidable in the running of mixed trains.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company.

GREAT NORTHERN RAILWAY OF IRELAND.

SIR,
Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 30th September 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 28th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred

on the 27th ultimo, between Skerries and Balbriggan stations, on the Great Northern Railway of Ireland.

In this case, as the 8.15 a.m. down limited mail train from Dublin to Belfast, consisting of engine, tender, post office van, first-class carriage, first-class break carriage, and first-class carriage (for Londonderry), all, except the last, fitted with the continuous vacuum-break, was running past Skerries station, the engine and tender separated (owing to the fracture of the coupling between the tender and front carriage) from the rest of the train, by which latter they were again overtaken after running about $1\frac{1}{4}$ miles, a somewhat violent collision ensuing.

Five post office officials in the post office van have complained of injury, two of the cases being serious.

The guard hurt his thumb.

The post office van had its frame and buffers damaged, the screw of the tender shackle was broken, and the link which passed over the hook of the first carriage was opened out.

Description.

From Skerries station northward the Great Northern line falls on a gradient of 1 in 323 for a distance of 470 yards, and then rises at 1 in 1567 for a considerable distance northward. The engine and tender broke away from the carriages on the falling gradient of 1 in 323, about 235 yards north of Skerries station, and the collision took place on the rising gradient about one mile 300 yards from its commencement, or rather more than a mile and a quarter from the point of separation. The line is straight for 13 chains north of Skerries station, and then curves to the west with a radius of 80 chains, the collision having occurred in this curve.

Evidence.

1. *Robert Harbrow*, driver 31 years on the Dublin and Drogheda section of the Great Northern Railway, and since the amalgamation driving as far as Portadown.—I have been accustomed to drive the limited mail up and down every alternate day. I was driving No. 14 engine, a single engine, and six-wheeled tender. The train was fitted with the vacuum-break applying to the driving and trailing wheels of the engine, all the wheels of the tender, and to all the vehicles in the train, except the last carriage for Derry, which is detached at Portadown. My fireman, Thomas Filgate, coupled the tender to the train with the engine shackle. On coming back to the footplate he made no remark about it. We started at 8.18, three minutes late. Nothing unusual occurred on the first part of the journey, except that I thought the train started a little heavy for about the first mile, and I had intended to have asked the guard about this at Drogheda, as to whether he had had his hand-break rubbing. I tried the vacuum-break before starting, and it seemed in good order. The train was checked nowhere, but we went as usual at a somewhat slower speed through Howth junction; and about three-quarters of a mile after passing Skerries station, when the speed was about 40 miles an hour, or rather more, I found that the engine had broken away from the train without any perceptible jerk. Just before this I had put on a little more steam, after having had it partially shut off in running down the Skerries bank. I had not moved the reversing lever after starting, and had had it in the second notch from the centre all the way. I had done nothing whatever to give rise to any unusual strain on the coupling, and I was very much astonished when I found that I had broken away from the carriages, which I did not discover until they were about half a mile from me, when I looked round, as I am in the habit of doing, without any particular cause having made me do it. I at once shut steam off, and, after having run about a quarter of a mile, I said to Filgate, "George is breaking them," thinking I saw them pulling up. We were then on a curve; I was standing on the outside, and the fireman on the inside, and I got the fireman to apply his break. He did so, and then remarked, "They are

coming fast." "Take off the break," I said, "and let her go," and I then threw the reversing lever (which I had not before stirred) into full forward gear and put steam full on, and a couple of seconds after this the carriages overtook me, my speed being 10 or 12 miles an hour, and that of the carriages 25 miles or more. I believe there was a second slight collision, and I then got away and kept away from them about 50 yards, when, on seeing that they had stopped, I came back, coupled on with the post office van coupling, and went on to Balbriggan, which I reached at 9.10, 21 minutes after the proper time. The vacuum-pipe at the back of the tender was damaged, and I was slightly burnt in the hand. The coupling was tightly screwed up, and the end of the screw would be rubbing against the hook of the tender. I cannot account for the link having opened out in the way it did. I asked the guard no question at the time. I was not aware that the vacuum-break would still be in operation on the engine and tender, after the carriages had broken away; and though I opened and closed the tap, I did not think it would have any effect, and this made me tell the fireman to use his hand-break. I did not feel any particular result from having thus applied the vacuum-break. I had passed a ballast-engine at Skerries station, and the 8 o'clock up train about the same place, before I was aware we had broken away. I used the van-shackle for going back to Balbriggan. When we arrived there the broken coupling was in just the same state as when the accident occurred.

2. *Thomas Filgate*, fireman four years, about four months with Harbrow.—I coupled on the tender of No. 14 engine to the post office van of the limited mail a few minutes before we started. I used the engine shackle and screwed it up tight; the end of the screw just touched the van-hook. I had generally used the same shackle for the last four months with the same van. The coupling was no tighter than usual on the day of the accident. All went right as far as Skerries. I was standing on the off side of the engine. I remember passing the ballast-engine at Skerries, but I do not remember hearing any break-whistle from this engine. Over half a mile past Skerries station

the driver was looking back, and said to me, "We have not got the train." This was the first knowledge I had of what had occurred. I then looked back and saw the carriages over a quarter of a mile away. He then shut off steam, and after running another half mile he looked back again and said, "The guard has them, put on the break," he having applied the vacuum-break before he told me to put on mine. I had felt the vacuum-break stopping us a bit, but I said nothing about it to the driver. I gave my break-handle three turns, and then I said, seeing the carriages were within a quarter of a mile of us, "Get on quickly or they will be in to us." I then released the break and jumped off the engine, when it was running about 10 miles an hour, the slowest speed it had been going. I kept my feet. I went on to the up line and ran back a perch or two before the carriages passed me at a speed of 25 miles an hour. I did not see the guard, but shouted, "George, George, are you there." No wheels were skidding. I then at once returned. I had to run back a quarter of a mile before I overtook the train, to which the engine had then returned. I got up on the engine and said to the driver, "We had better get on to Balbriggan as soon as possible." He then got down and coupled up with the side chains of the van and part of the tender coupling. We then went to Balbriggan and I there observed that one-half of the coupling was on the tender and the other half on the carriage; the link was opened out in the way it is now.

3 *George Finnigan*, guard 28 years.—I was in charge of the down limited mail which consisted of four vehicles. I was riding in the last but one. I had no control over the vacuum-break with which the train was fitted, but I could apply my own hand-break. We started at 8.18, three minutes late, waiting for the mails. There were 16 passengers and five post office officials. I was alone in the break-compartment. I had not my break on when we started. Nothing occurred as far as Skerries, up to which we were running at the ordinary speed; and the first knowledge I had of anything being wrong was being stunned by the collision between the carriages and engine. I was hurt in the head and hand. Up to this point I

had felt no diminution of speed, nor anything to indicate the separation. After seeing the Skerries signals were right I had taken out my book to enter the time of starting just after passing Skerries, and had it in my hand when stunned. There was blood on my book. I heard no whistle from the ballast-engine at Skerries. I had no opportunity of speaking to any of the post office officials. After a delay of about five minutes we went on to Balbriggan.

4 *John English*, driver 12 or 13 years.—I was driving the 8 o'clock up train from Drogheda the morning of the accident. I passed the down limited mail about 25 yards north of Skerries station. The train was then altogether, and I noticed nothing unusual in the speed. We gave each other the usual driver's signal. My guard told me at Rush station that he had seen the engine separate from the carriages of the mail after they had passed Skerries station.

5 *Nicholas Markey*, guard 13 years.—I was riding in the rear van of the 8 o'clock up train from Drogheda. I passed the down limited mail about 30 yards north of Skerries station. Directly after I heard a whistle from an engine in the ballast pit, and I then got up on the box and looked out of the window and saw that the engine of the mail had separated from the train, and that the distance was increasing. I informed the station-master at Skerries, and he said he had noticed it himself.

6 *Edward Jones*, driver seven months with the Great Northern Company, previously nine years with the London and North-western Railway.—I was standing on a ballast-engine in a siding about 100 yards north of Skerries station when the limited mail passed. The engine had got a short distance past me when I saw it separate from the train. The engine was increasing its distance from the train when I lost sight of it. The speed struck me about the same as usual. I saw the driver with his hand on the regulator as if he was putting on steam. I gave the regular break-whistle several times till he got out of my sight.

Conclusion.

The immediate cause of this collision was want of judgment on the part of the driver of the mail train, in allowing the carriages which had formed part of this train to come into violent collision with his engine, after having observed that he had broken away from them about three-quarters of a mile before they again overtook it. He was, no doubt, to some extent deceived as to the amount of stopping power he had under his control, having, as he says, supposed that the severance of the vacuum-break connection between the engine and carriages would have prevented the action of the break on the engine and tender wheels; whereas, owing to there being an independent connection for this latter purpose, the break still remained applicable to these wheels, and thus, when he from the force of habit touched the vacuum-break handle, he must have retarded the engine's progress much more rapidly than he had intended or thought to do.

It is difficult to understand why the screw of the shackle should have broken as it did. It was made of Yorkshire iron, $1\frac{1}{2}$ inches in diameter; it had been in use only since April last, and showed no flaw on the surface of fracture. It must have received some injury previous to its use on the present occasion, as there was nothing in the running of the mail train to account for its having given way when it did.

It is a curious fact that neither the driver nor fireman should have been aware that the engine had broken away from the train for about half a mile after it had done so, and equally curious that neither any of the post officials (as I ascertained from the secretary of the post office) nor the guard observed any diminution of speed up to the time of collision, though the carriages had been running by themselves for more than a mile up a slightly rising gradient, which must have very considerably reduced their speed.

This collision affords a striking illustration of the value of an *automatic* continuous break. Had this train been fitted with a break of this description, the carriages would at once have been arrested in their course on the separation occurring, and no collision would have resulted. The secretary of the Great Northern Company of Ireland informed me that the vacuum break was being tried merely experimentally on his line, and that no decision had yet been come to as to what break would be finally adopted.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on the 30th October.

GREAT WESTERN RAILWAY.

Railway Department, Board of Trade,

SIR,

13, Downing Street, 27th June 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in your minute of the 13th instant, the result of my inquiry into the circumstances which attended a collision, that occurred on the 8th instant, between a passenger train and a portion of a goods train which had become detached, and which were proceeding in opposite directions, on the single line of the South Devon section of the Great Western Railway, between Kingsbridge Road and Brent stations.

Four passengers have complained of having been injured on this occasion, and three of the Company's servants were also hurt.

The engine of the passenger train had its front buffer plank and buffers broken, the smoke box stove in, life guards broken, sand box damaged, and the chimney knocked off. Four vehicles in the passenger train had their buffers bent or broken.

Of the 14 vehicles which had become detached from the goods train, eight trucks and two third-class carriages fitted with breaks were more or less damaged, two of the trucks being smashed to pieces, and the ends of two third-class carriages, which were used as breaks for the goods train, were also smashed in.

The Kingsbridge Road station is 2 miles 15 chains from Brent station, on the eastern side of Kingsbridge Road station, and 3 miles 21 chains from Ivy Bridge station to the west. Kingsbridge Road station is situated on a short piece of level line at the summit between Totnes and Plymouth, and there are falling inclines at each end of the station, on which vehicles will not remain stationary unless controlled by breaks.

A considerable portion of the main line of the South Devon Railway is still only a single line, with loops at sundry stations, Kingsbridge Road among them, for the crossing of trains travelling in opposite directions. In addition to the loop line at this station, there is a siding off the down line, at the western end of the station. The traffic is worked on the absolute block system, with the assistance of the electric telegraph; and although the proper places where up and down trains should pass each other are prescribed in the Company's service time tables, rules are laid down by which these passing places may be changed when the trains in either direction are not running to time. On the morning in question the 8h. 35m. a.m. up passenger train from Plymouth was appointed to cross the 7h. 5m. a.m. down passenger train from Exeter for Plymouth at the Kingsbridge Road station.

The evidence in this case was mostly taken down on the day on which the collision occurred by Mr. Compton, the Company's superintendent of traffic on this section, and repeated to me, with such additions as seemed necessary, on the day on which I made the inquiry.

Evidence.

Signalman *William Wakeham* states,—I came on duty at Kingsbridge Road station at 8.0 a.m. this morning, and when I came on duty the short 12.30 a.m. train from Plymouth was standing on the down line; they had been putting away the train and marshalling trucks to form the 4.45 a.m. train for Plymouth. I believe there were 14 trucks on. At the time the short goods train was standing on the down line, there was a special potato up train off Ivybridge, which crossed them at Kingsbridge Road,

and after that train (the up special) had left Kingsbridge Road station I sent the engine and van of the short goods train and some trucks for Kingsbridge Road to the west sidings, and a man went down to the sidings to work the point levers which are concentrated in the west hut. The formation of the trucks was completed as far as the west sidings were concerned, and the engine returned with them about 8.46 a.m., and went over the eastern points, and came back and coupled up to the trucks which had been left on the down main line. The down fast goods was then due, and the engine came around the train and pulled it down over the west points, and came back on the up line, to allow the down fast goods to pass. The fast goods passed in due course, and as soon as that train reached Ivybridge "line clear" was asked from Ivybridge for the 8.35 a.m. up express train at 8.59 a.m., and "line clear" was given for the 7.5 a.m. down passenger train to Brent station at 9.0 a.m. I gave "line clear" for these two trains, and told the guards of the short goods train that the goods train was to stand where it was on the up line until I knew which train would come first, the 8.35 a.m. up, or the 7.5 a.m. down passenger train, which were due to cross each other at Kingsbridge Road station. Finding that the 8.35 a.m. train was gonged off Ivybridge, I sent the short goods train over the east end points, to come back on the down line, to let the up express train into the station. As the short goods train was being pushed back over the east end points, I heard a chain snap, and I immediately afterwards heard the driver blowing his break whistle, and afterwards found the train had run back and come into collision with the 7.5 a.m. down passenger train from Exeter. As I had given Brent "line clear" for the 7.5 a.m. down passenger train to leave that station for Kingsbridge Road, *I know I did wrong in sending the goods train over the eastern points on to the single line beyond it to get on to the down line.* I did so to avoid delaying the 8.35 a.m. up express train, as that train had left Ivybridge for Kingsbridge Road about one or two minutes before Brent signalled me that the down passenger train had left that station. As the goods train had on 24 vehicles, I knew that the tail of the train would be beyond the home-signal. I never had authority to do such a thing, but I did it, as I said before, in order not to delay the up express train, and so avoid any complaint about delaying that train. I was in bed last night from 10.0 p.m. until 7.0 a.m., so that I was not in any way tired when I came on duty this morning. I had had my breakfast. I have been in the service six years, and have been at Kingsbridge Road station since November last, and have taken day and night duty alternately since. I told the driver and guard of the short train to push back over these points and get on to the down line. If the coupling had not broken the goods train would have been clear, I think, on the down line, before the 7.5 a.m. train ran up. The goods train would have been put into the goods siding had the siding not been too full of trucks to admit of it. I have done the same thing before, in order not to delay the traffic.

Engineman *George Cockrell* states,—I had 2,169 tank engine and had worked the 12.30 a.m. up goods train from Plymouth, and I shunted it and put it away. I had also formed the 4.45 a.m. goods train from Kingsbridge Road station, when I received orders from the signalman, at 8.55 a.m., to push my train back from the up platform over the eastern points, and then to run forward on the down line to allow the 8.35 a.m. up passenger train from Plymouth to pass into the station. When I reached the tunnel, all my train was over the points with the exception of the engine and two trucks. I was proceeding slowly backwards and did not have my break on, when my train parted, three trucks from the engine (I had 24 on), and the rear part of my train ran back towards Brent. I immediately sounded my break whistle, and followed my train cautiously, sounding my whistle the while. Two 3rd class carriages were acting as break-

vans for my train. The head guard was in the rear van, and said he applied his break, but it would not hold the train. The second guard was on the step of the engine at the time of the train parting, to give the signal to the switchman in the signal-box when the engine and train had passed over the points. The second guard ran after the train and was able to apply two of the breaks of the trucks, it might be two or three, but it could not be from 9 to 12. Several trucks passed him which had no breaks at all. The tail part of my train ran out past the distant signal at Kingsbridge Road, and in a few minutes I saw the trucks suddenly stop and heard a crash, but could not see the cause, it being a sharp curve. My engine had not reached the first over-bridge from this station. On arrival at the scene of the accident, at 9.0 a.m., I stopped my engine, and walked partly down the train, and discovered it had come into collision with the engine of 7.5 a.m. down passenger train from Exeter. The engine 2,085 was damaged, also the break carriages of my train and trucks, and several trucks were off the line. As soon as the officials arrived at the accident, I had orders to pull the remaining trucks that were not off the line into Kingsbridge Road station, and I took six and one that had been off the road into the yard. I afterwards brought seven more trucks into the station yard. My opinion as to the cause of the train breaking away, was that it was caused by a defective link; I saw a flaw in the link when it was picked up. At Kingsbridge Road station I received orders to work the down north mail, and I transferred the passengers to Plymouth, starting at 12.0, and arriving at Plymouth 12.50 p.m. The trucks were running away at the rate of about five or six miles an hour. I saw the second guard running alongside the train, at times; but I was not keeping a look-out upon him all the time. He may have passed from truck to truck in order to put the breaks down.

Goods guard *Samuel Hannaford* states,—I acted as head guard of the 12.30 a.m. up short goods train from Plymouth to Kingsbridge Road station this morning. We left Plymouth at 1.17 a.m. Laira arrived at 1.29, departed 2.0; 15 min. shunting; 16 min. waiting for up special potato train to pass. We were detained at Tavistock junction from 2.4 a.m. to 2.37 a.m., to allow an up special goods train which preceded the up special potato train to Plympton where it shunted for the up potato train to pass. Plympton, arr. 2.41 a.m., dep. 3.37 a.m.; 10 min. shunting, 6 min. for water, 40 min. waiting for the up goods special to clear Hemerdon incline. Hemerdon, arr. 3.55 a.m., dep. 4.35 a.m.; 10 mins. shunting and 30 min. for 3.0 a.m. down London mail to come off single line. Ivybridge passenger station, arr. 4.47 a.m., dep. 4.52 a.m.; five minutes loading goods. Ivybridge siding, arr. 4.56 a.m., dep. 5.45 a.m.; 49 min. shunting off 10 trucks and taking on 13 trucks. Kingsbridge Road, arr. 5.55 a.m., instead of 3.50 a.m. We made two shunts, and then drew the train ahead for 2.0 a.m. down goods. They had a truck off that train, and I divided my train to take it from that train. We then came back and coupled up to clear the down line for the down 2.0 a.m. to go by. We then pushed back again to finish the shunting. We made three shunts more, which finished the work at the east end of the yard. We then went to the east end points and shunted on to the down line, to allow the 6.45 a.m. up passenger and another up special potato train to pass. We then went to the other end of the yard with three Kingsbridge Road trucks and the two vans, and formed the down train with the vans at the west end, and brought them to the station to be marshalled with the trucks standing at the station on the down line. The engine then ran from the east to the west end of the yard and got in front of the train, so as to be ready to start for Plymouth. We then shunted from the down to the up line to allow the down fast goods train, 10.45 p.m. from London, to pass. After the down fast goods train left Kingsbridge Road for

Plate No 1.

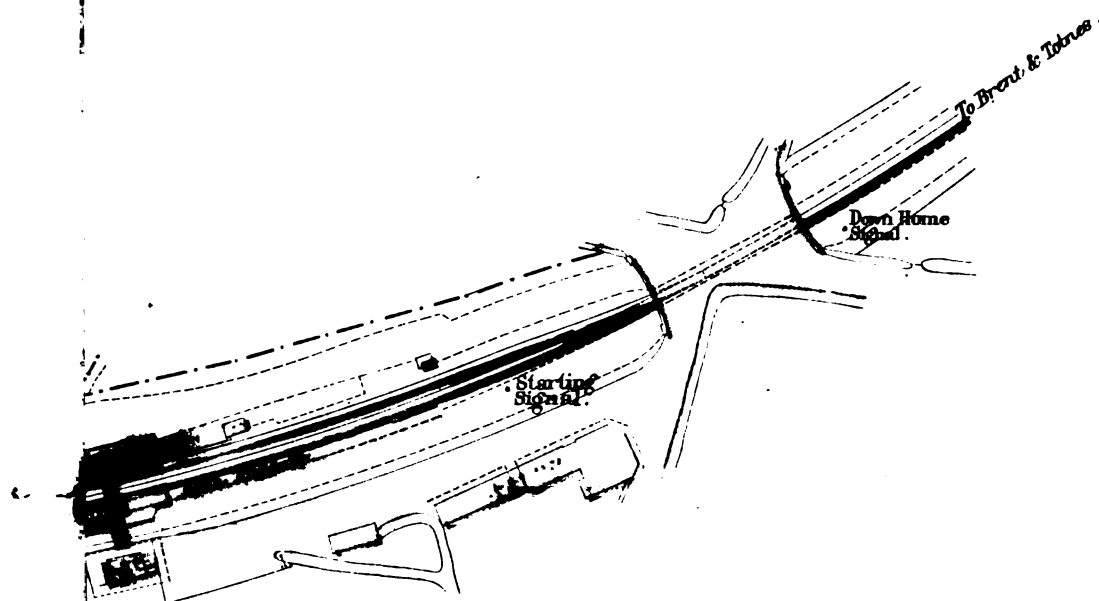
*To accompany Colonel Yelland's
Report dated 27th June 1878.*



To accompany Colonel Yolland's Report

Dated 27th June. 1878.

WAY.



Plymouth, at 8.50 a.m., my train stood on the up line for, I should think, 10 to 12 min.; part of that time I was taking the numbers of trucks, but for 5 min., I should think, I was sitting in my van waiting for the train to be moved forward or backwards, according to the instructions from the signalman to the driver. I had no conversation with the signalman in the hut, nor with the station master. I had seen him at the station when the 6.45 a.m. up passenger train went through, at about 7.40 or 7.50 a.m. I heard the driver of my train blow his small whistle, and I looked out of the window and found the train was backing towards Exeter, and when my break carriage reached the east end points I began to put my break on. I was riding in my van, the last but one vehicle of that train. There was a break carriage behind me, for my mate to ride in, but he was not there, as I saw him shortly before coupling up trucks about the centre of the train. When I put my break on I found the trucks press against it, and I then put it on as tight as I could and chained it, and I then heard the driver of my train blow his break whistle, and immediately afterwards I heard the driver of the 7.5 a.m. down train blow his break whistle. I tried to get out of my van with a spragg in my hand, but before I had time to get out the collision took place, and I was knocked down by being forced up against the break-handle, and I did not know where I was for some time. I had a blow on my chest from, I think, the break-handle, but was not otherwise hurt. The door of my van was made very tight by the collision, and I had difficulty in opening it, and two compartments of it were knocked in. On getting on to the ground I found that the 7.5 a.m. down train had come into collision with my train, and the break carriage which was behind mine was very much damaged; several trucks were knocked off the line, as well as the leading wheels of the passenger train engine. I did not see that anyone had been injured. When my train was pushed back from the station I thought that the 8.35 a.m. up express was going to cross the 7.5 a.m. down passenger train at Brent instead of at Kingsbridge Road, but I did not enquire of the signalman nor of the station master. We have pushed back previously, as we did to-day, to get upon the down line to allow the 8.35 a.m. up express to pass up, but in those cases that train crossed the down 7.5 a.m. at Brent, but I have never known a case of our backing or running out against a down passenger or goods train, like we did this morning. I ascertained from the signalman some time before, that we could not leave Kingsbridge Road station until the 8.35 a.m. up and the 7.5 a.m. down passenger trains had gone. I have been in the Company's service 16 years, and have been a goods guard 12 years. The distance between the wagons when the break whistle was sounded was about the length of a truck; three trucks were left attached to the engine; thinks two contained gas coal, and one tiles. About 1 to 1½ minutes after whistle was sounded the collision occurred. I think we were running about two or three miles an hour when the collision took place.

Goods guard *Thomas Marshall* states,—I acted as second guard with Hannaford on the 12.30 a.m. up goods train from Plymouth to Kingsbridge Road this morning. This train works between Plymouth and Kingsbridge Road only, doing the local work between those points. After finishing our work at Kingsbridge Road station, at about 6.30 a.m., we were told by the signalman to stand on the up line to allow a special down goods and the down fast goods to pass for Plymouth. When those trains had passed, at 8.35 a.m., we had not time to leave Kingsbridge Road station for Ivybridge, to cross the 8.35 a.m. up express train there, as we had to do work at Ivybridge siding, and the signalman told me we were to stop at Kingsbridge Road until he told us which road to stand on for the 8.35 a.m. up or 7.5 a.m. down trains to pass each other. I asked him whether we had to change over for the 8.35 a.m., or stand where we were for the

7.5 a.m. train to pass. He said, you must stand where you are, until I give you orders. Shortly afterwards, he said, the 8.35 a.m. up express is off Ivybridge, and we were to shove back over the east points, and that we were then to pull ahead on to the down line, and shunt back and stand behind the up express train on the up line, to allow the 7.5 a.m. train to cross the express. He also told me that the 7.5 a.m. was at Brent, but did not say that he had given "line clear" for it to come on. I did not think that the signalman would have given "line clear" for the down train, until we had pulled in off the single line on to the down line and clear of the down platform, because the line drops a bit from the tunnel eastwards. It did not occur to me to ask him if he had given "line clear" for the 7.5 a.m. train, neither did I ask him. At the time the signalman spoke to me from the window of his signal-box, I was standing on the line by the side of the train, five or six trucks length away from the engine, having just finished coupling up. My mate was in his van, the last vehicle but one in the train. There were 22 trucks, and 2 break carriages in the train. I gave the driver a signal to push back, and I jumped on the steps of the engine to see that the east end points were closed after we had run over them from the up line. Just as the engine was on the heel of the points, the fireman put his break on, and the train broke away between the third and fourth vehicles from the engine, and 19 trucks and 2 break carriages ran back. I immediately jumped off the step of the engine and put down all the truck breaks I possibly could. There was a break in the first truck, an empty one, and after putting that down I went from truck to truck until I had put down several breaks, 9 or 10, and until there were no more breaks to put down, and I then jumped off, and immediately afterwards the collision occurred. The trucks were not travelling faster than three or four miles an hour at the moment of collision. The carriage which I intended to use as a break, was the one first run into at the tail of the train, and it was very much damaged, and had I been in it at the time of the collision I must have been injured, as the break compartment was smashed in. I asked several passengers if anyone was injured, and they said no. I heard the break whistle of the 7.5 a.m. down passenger train engine blown before the collision occurred. Two passengers told me that they saw the trucks approaching their train just before the break whistle was blown. I do not know of an instance where an up train has been pushed over the eastern points at the time that "line clear" has been given for a train to leave Brent. The siding at Kingsbridge Road station was so full of trucks that it could not be used. There were a large number of trucks of coal for Ivybridge siding there. I have been in the company's service seven years, and have worked goods trains three years, and have worked the same train 18 months. The cause of the train becoming disconnected was, that a coupling link broke which had a flaw in it, and there was no hook to the draw-bar chain of the truck next it, so that the truck was connected with one draw-bar chain and two side chains, and the link breaking caused the side chains to be pulled out. If there had been a second draw chain hook, I do not think the accident would have occurred.

Booking porter *Thomas Prout* states,—I came on duty this morning at 7.0 a.m. I found the 12.30 a.m. short up goods train in the yard. There was a horse-box for Oxford to go away by the 6.45 a.m. up passenger train from Plymouth. I told guard Marshall to move his train ahead, so that the 6.45 a.m. passenger train from Plymouth could shunt back over the crossing for a horse-box. After the horse-box was taken on by the 6.45 a.m. train, I told guard Marshall to put his train back clear of the up line to allow 6.45 a.m. train to pass out. After the 6.45 a.m. up passenger train left, about 7.50 a.m., I went up into the passenger booking office, and commenced making out my goods abstract, and at

8.40 a.m. I commenced booking passengers for the 7.5 a.m. down passenger train from Exeter. When doing so, at about 9.5 a.m., I heard the goods train referred to push back eastwards, and I heard a coupling chain break, and I thought the train had broken loose. I thought it had done so from the noise. I know the line falls from the tunnel towards Brent, so that a train being pushed back over the eastern points would be on a falling gradient. When I heard the couplings break, I knew that the train was being pushed back, and thought it was from the breaks being put on suddenly, which proved to be the case. I immediately closed the ticket case, and went down to the scene of the accident, and found that the 7.5 a.m. down passenger train had come into collision, with the trucks which had broken away, near the down distant signal. I enquired of the passengers in the down train if they were hurt. One passenger, Mr. Bickford, staff surgeon of H.M.S. "Hecate" gave me his card, and said he was bruised in the chest by striking against another passenger. A Mr. Rowell of Paul Street, Exeter, told me that he had a blow on the head, crushing the brim of hat, and there was a slight scar on the forehead, and there was a little blood coming from it, as if from a scratch. These were the only complaints I heard. Mr. Rowell went by coach to Kingsbridge shortly after the accident. I don't know where the other passenger went. When I left the yard to go to the booking office to begin my abstract, I did not know where the short goods train then in the yard would cross the 8.35 a.m. up express train and the 7.5 a.m. down passenger train, but I thought the short down goods train would have gone to Ivybridge in front of the 7.5 a.m. down passenger train, as they must I think have finished their work, but I did not inquire either of the guards or the signalman. I did not notice any trains coming in after that, but there was an up special goods from Plymouth, which arrived here at 8.18 a.m., stopped, and went on at 8.26 a.m. I often go down to the yard to see what is going on, in the shape of trains running, &c., as you asked me to do the last time you were at Kingsbridge Road station, but on this occasion I did not go down. I left the signalman to arrange the despatch of the goods train, &c. The signalman knew, I think, that I was in the office, and if he wanted me he would have rung the bell which he has in the signal-box. The signalman was wrong to-day in allowing the goods train to shunt back over the eastern points after "line clear" had been given for the 7.5 a.m. down passenger train to come on from Brent. The signalman should have kept the down short goods train on the up line until the down train had arrived, and then should have pushed it over the eastern points; and yesterday or the day before, a goods train was so shunted behind the same passenger train. If the goods train had been standing on the down line, instead of on the up line, the up express would have been first admitted, and the down short goods train would then have been put at the rear of the up express to allow down passenger trains to come into the station. I leave the shunting to the signalmen and the goods guards as a rule; but I often go down by day and see how it is done, and tell them the best way, in my opinion, to shunt. I may have told the signalmen that they should never shunt a train outside the yard after "line clear" has been given for a train, but the rule has always been very exact, not to shunt after "line clear" has been given either from Brent or from Ivybridge, but I can't say that any written instructions have been given by me. I have been in the company's employ 31 years, and at Kingsbridge Road station 29 years. We have never had an accident before of the same kind as happened this morning. I have never known a case of a train

being pushed out of the yard towards a train after "line clear" had been given for it.

William Chiswell, engineman, states,—I worked the 7.5 a.m. down passenger train from Exeter to Plymouth, with engine 2085, and six coaches, on the 8th June 1878. I left Brent at 9.2 a.m. The starting signal was showing "all right," and on approaching Kingsbridge Road station the down distant-signal was at "danger," and I shut off the steam, and was going on cautiously. My fireman then hallooed out that there was a train coming back. I reversed the engine, and blew the break whistle, but was unable to stop, but slackened down to four or five miles per hour. There was no man back. I saw a man in the second van looking out of the window. I do not think any passengers were hurt. I was a little bruised on my left leg by the coal flying about; my mate was not bruised. The smoke-box of my engine was knocked in, and the front buffer plank broken, and chimney knocked off. I was only about 8 or 10 coaches length off, when my mate hallooed out that a train was coming. We had passed the first under-bridge from this station when my mate called out, and the collision occurred outside the down distant-signal.

Henry Price, guard, states,—I worked as head guard of the 7.5 train from Exeter this morning. My train consisted of a tender, engine, six carriages, and two break-vans. One break-van was next to the tender in which I rode, and the other was a break-carriage towards the tail of the train. I don't know exactly where it was. We left Brent at 9.2 a.m. When near the down distant-signal at Kingsbridge Road station my driver blew the break whistle, and I applied my break, and we almost immediately came into collision with a goods train which had been backed from the station. The shock was severe. I had hold of my break, and my break was on. I was thrown against the partition of the van violently, and the back of my ear bled from the blow. I feel a bit stiff in the shoulders. I did not hear any passengers complain. I inquired of many if they were hurt, and they all said "No." I saw one gentleman with a slight cut on his lip. I spoke to him, and he said he had been thrown against the compartment opposite where he had been sitting. That is all I know of any passengers being injured. The driver told me a lump of coal struck him on the leg. We were only running about six miles an hour when the accident occurred. The driver told me, as soon as he saw the goods train approaching him he reversed his engine. The speed was reduced before the driver saw the trucks, because the signal was against him. The front wheels of the engine were thrown off the rails, but neither the tender nor any of the carriages were off the road. The collision occurred some little time after 9 o'clock.

James Higgs.—I acted as second guard of the 7.5 down passenger train this morning. When my driver blew the break whistle I just had time to put on my break when the collision occurred. I jumped out, and found my mate was not seriously injured, and then went back to protect the van. I went to Brent, and telegraphed for the break-down gang. I saw a gentleman with his nose bleeding. He said he was a surgeon, and I asked him to go in front and see if anyone was injured. He didn't say how he was injured. We were running five or six miles an hour at the time of the collision; it was severe. The speed had been reduced before the break-whistle was blown. I rode in the last coach which had a break in it. The leading wheels of the engine were the only wheels thrown off the rails.

From the preceding statements it appears that at Kingsbridge Road station "line clear" was asked for from Ivy Bridge station for the 8h. 35m. a.m. up express train at 8h. 59m., and permission for that train to come on was given; and that "line clear"

was given to Brent station for the 7h. 5m. a.m. down passenger train from Exeter for Plymouth at 9h. 0m. a.m.

At that time the 4h. 45m. a.m. down short goods train, which was due at Plymouth at 6h. 55m. a.m., was standing with the engine at the western end of the train on the up line. It consisted of an engine, 22 trucks, and two third-class carriages, fitted with breaks at the rear or eastern end of the train, and the guards were told to remain on the up line until the signalman (Wakeham) had ascertained which of the two trains, viz., the 8h. 35m. a.m. up express or the 7h. 5m. a.m. down passenger train, was likely to arrive first at the Kingsbridge Road station; and as soon as he had ascertained, he directed that the 4h. 45m. a.m. down short goods train should be shunted back clear of the points at the eastern end of the loop line, in order that it might be drawn forward on to the down line, thus clearing the up road for the 8h. 35m. a.m. up express train to pass into the station, where it was appointed to stop. It was further intended when the 8h. 35m. a.m. up express train had reached the station, that the 4h. 45m. a.m. down short goods train should be drawn ahead on the down line over the western points of the loop, and then shunted back on to the up line, behind the 8h. 35m. a.m. up express train, in order that the 7h. 5m. a.m. down passenger train might pass from the single line between Brent and Kingsbridge Road into the station on the down line, and thus allow the 8h. 35m. a.m. up express train to proceed to Exeter and London.

However, when the 4h. 45m. a.m. down short goods train was shunted back to the eastern end of the station, and over the eastern points of the loop line, which points are situated in a short tunnel or covered way that carries the turnpike road over the railway, it got upon a falling gradient of 1 in 132, and the driver found that his train had separated into two parts, and that the rear part, consisting of 19 trucks and two third-class carriages, was running away from the engine and the three remaining trucks still attached to it, down the incline towards Brent station. This happened from the fracture of a coupling link, caused by a very large flaw in the weld. The head guard was riding in the leading third-class carriage at the rear of the train, and he states that he began to put his break on when his carriage reached the eastern points of the loop; and the under guard says that he rode on the step of the engine as the train was pushed back, and just as the engine was on the heel of the eastern points of the loop line the fireman put the engine break on, and the train broke away between the third and fourth trucks from the engine. He says that he then jumped off the step of the engine, and began to put down all the truck breaks that he could, to the extent of 9 or 10 altogether. The driver, when he found that the train had separated into two parts, sounded his break whistle, and cautiously followed the runaway portion of his train. I do not think the under guard can have acted as he stated, as to putting on such a large number of breaks on the trucks, or the train would have been stopped. The collision occurred about 858 yards east from the signal box, or 572 yards outside the down home-signal, or 66 yards outside the down distant-signal, which was on at "danger" against the advancing 7h. 5m. a.m. down passenger train.

The runaway trucks are said to have been running at from two to five or six miles an hour, and the 7h. 5m. a.m. down passenger train at five or six miles an hour, when the collision took place.

The runaway trucks could not be seen by the driver of the 7h. 5m. a.m. down passenger train until the third-class break carriage at the rear of the trucks had passed through an over bridge, which is about 748 yards from the signal box; and the driver further states that he had passed an under bridge, which is about 961 yards from the signal box, when the fireman called out that a train was coming back. No blame attaches to any of the Company's servants with the 7h. 5m. a.m. down passenger train, but it is probable that if this train had been fitted with continuous breaks under the control of the engine driver, the effects of the collision would have been diminished, although it would not have been altogether avoided.

The coupling link which broke was attached to a trader's truck, and it is not known how long it had been in use. It was $1\frac{3}{4}$ inches in diameter, and the fracture took place at a weld, where the iron that was properly united did not amount to more than about one third of the sectional area.

The Great Western Book of Rules, agreeing with the Clearing House Rules of November 1876, contains the following rule: "156. The line must not be obstructed or occupied by shunting or otherwise, until the signals applicable to the line or lines about to be obstructed have first been placed at 'danger.' Where the block system is in operation, and it is found necessary to foul or occupy any portion of

“ the line outside the home-signal, the line must first be blocked back by telegraph to the signal box in rear, before such obstruction is permitted.”

Not only was this rule not carried out, but the shunting back of the 4.45 a.m. down goods train over the points at the eastern end of the loop out on to the single line, and on to the falling gradient of 1 in 132, commenced after “line clear” had been given to Brent station for the 7h. 5m. a.m. down passenger train to leave that place for Kingsbridge Road station. The signalman, Wakeham, admitted that he had done wrong in doing this, and he also allowed that it was not the first time that he had done so, in order to facilitate the passage of up and down trains crossing each other at this station.

This collision was therefore occasioned by an improper mode of working the traffic under the absolute block system at Kingsbridge Road station, by the signalman on duty, Wakeham; and it is most fortunate that it was not attended with far more serious results.

It is, however, right to state that from the construction of the station, and the insufficient amount of siding accommodation provided, a similar collision may occur any day from a similar fracture of a coupling, without any infringement of the regulations for working the traffic on the absolute block system, if the same mode of shunting a train over the points at the eastern end of the loop line, on to the falling gradient of 1 in 132, in order to pass that train from the up to the down line, be continued, because such a train, if not brought to a stand by the breaks that might be put on, would certainly run past Brent station, and might be met at the eastern side of that station by a down train from Totnes, on its way to Kingsbridge Road and Plymouth.

The plan of the station at Kingsbridge Road, which has been supplied to me by the officers of the Company, at my request, and the section showing the gradients and inclines between Plympton and Totnes, will show the risks which are involved in the present construction of the station and in the shunting of trains out on to the falling gradients, if a coupling should at any time break or become uncoupled from any cause whatever.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
W. YOLLAND, *Colonel.*

Printed copies of the above report were sent to the Company on the 13th Jnly.

GREAT WESTERN RAILWAY.

SIR,

Board of Trade (Railway Department),
13, Downing Street, 14th October 1878.

IN compliance with the instructions contained in the order of the 4th ultimo, I have the honour to report, for the information of the Board of Trade, the result of my enquiry into the circumstances connected with the collision that occurred on the 30th of August last, at the Princes Risborough station of the Great Western Railway.

The 7.25 p.m. passenger train from London to Aylesbury ran against some coal waggons that were standing in a siding at Princes Risborough.

Seven passengers, and the engine-driver and guard of the passenger train, are reported to have been hurt, but their injuries are not believed to be serious.

The lines from Aylesbury, Oxford, and Watlington join at Princes Risborough. The station and junctions are protected by the ordinary home and distant signals. The signals and some of the points are worked from a raised signal cabin at the west end of the station, and are interlocked with each other. Several pairs of points are worked on the ground, and are interlocked from the same signal cabin by means of bolts and wires on an old system, which has now been very much improved upon.

On the day of the collision the passenger train, which consisted of a tank engine, four passenger coaches, and a break van at the tail of the train in which the guard in charge was travelling, reached Princes Risborough from London and Maidenhead at 9.50 p.m., five minutes late. The train stopped about two minutes at Princes Risborough to discharge its passengers, and then the guard whistled and held out a green

DIAGRAM OF SIGNALS.

DIAGRAM OF SIGNALS.

Note. Prints A.B.C. & D are locked by the Wire to No 2 Signal.

F " " " " "
to No 4 Signal.

F	"
Nos 23 & 24 Signals alternately.	"
"	"
"	"
"	"

light to intimate to the engine driver that the station work was done, and that the train might proceed on its journey to Aylesbury. The starting signal had already been lowered at this time, and the engine driver put on steam and started his train.

About 50 yards north of the Princes Risborough station platform there are a pair of facing points which lead to a siding on the west side of the line to Aylesbury. Immediately after the engine of the passenger train passed through these points the engine driver felt his engine twist, as it moved over the crossing which is made by the junction of the siding with the passenger line. He shut off steam at once, and had no time to do anything more, before his engine struck some goods waggons in the siding, was thrown off the rails, and fell down the bank into a field on the west side of the line. The carriage next to the engine also fell into the field. The second coach was dragged off the rails but remained on the embankment, which is about six feet above the field at this place. The rest of the train remained on the rails. The engine came to rest with its wheels in the air, and the engine driver was caught under it by the corner of the tank. The fireman also fell under the engine, but escaped without any injury. He had no time to put his break on. The coach next to the engine fell over on its left side. The guard was knocked down by the collision. His van came to a stand immediately afterwards, when he got out, and gave such assistance as he could to the engine driver and passengers.

The evidence is as follows. The statements of Holloway and Winch were made to the officers of the Great Western Railway when they enquired into the circumstances of the accident. The first of these men was discharged for neglect of duty, and the second left the service of his own accord, so that I did not see either of them. The diagram attached is referred to in these men's evidence.

Thomas Collier, driver, states:—I was driver of the 7.25 p.m. passenger train from Paddington on the night in question; due at Princes Risborough at 9.45 p.m. We left Paddington about three minutes late, and were about the same time late arriving at Maidenhead. We were about two minutes at Princes Risborough, and then my guard blew his whistle, and gave me a green light that he was ready to start. The starting signal for Aylesbury had been taken off when the guard gave me the signal to start, and the signalman came out of his cabin, and told me it was all right. As my engine reached the crossing of the siding with the Aylesbury line, I noticed her twist, and I immediately shut off steam. The engine hit some waggons that were in the siding immediately afterwards, and I was knocked against the reversing lever, and did not know what happened until I found myself in the field on the west side of the line. After a little while I came to myself, and found the engine in the field pressing on my chest. I was taken out by the guard and my fireman. I was bruised in the legs and thighs, and squeezed in the chest, and was taken to my home at Aylesbury. I have been 12 years a driver, and 30 years altogether in the Great Western Company's service. I cannot say at what speed we were running. When I felt the engine twist, I had only time to shut off steam. My engine was a tank, and was running with the funnel in front. I had four passenger carriages attached to it, and there was a van at the tail of the train, with the guard in charge.

Charles Collier, fireman, states:—I was fireman of the 7.25 p.m. train from Paddington on the night of the accident. I was attending to my fire while the train was standing at the platform at Princes Risborough, and before we moved from the station I noticed that the starting signal for the Aylesbury branch was pulled off all right, and was showing a white light. I saw the policeman come out of the signal-cabin, and heard him tell my mate that it was all right to start. I was just looking over the side of the engine to see whether I could see the siding rails (and I could not see them as the night was very dark), when at this moment the engine struck the coal waggons which were standing in the siding. Immediately after striking the waggons, the engine fell down the bank, which is about six feet high,

and fell over into a field. It fell over on the top of me, but did not touch me. When I got out and looked at it, I saw it was turned topsy-turvy, with the wheels leaning over rather towards the west. I have been a fireman five years, and something over six in the Great Western service. I was not hurt. I saw my driver, who was also under the engine, was caught between the tank and the coal bunk. I think it was part of the tank on the left side of the engine where I had been standing that was pressing on the driver.

John Lansdowne, guard, states:—I am a guard in the service of the Great Western Railway Company. I have been guard about 12 years. I took charge of the 9.5 p.m. train from Maidenhead (7.25 p.m. from Paddington), which consisted of a tank engine, two thirds, one first, and one second class coach, also a van, on Friday, August 30th, at Maidenhead. We were five minutes late starting,—waiting the arrival of the 8.45 p.m. train from Great Marlow. Everything worked well to Princes Risborough. We left there at 9.55 p.m., and in about half a minute I was thrown against the wheel in my van, and knocked back on to the floor, the train coming to a dead stand. It turned my lamp over, and put it out. I got up and looked out of the window, first one side, and then the other. I heard a noise which I thought was the engine running away. I looked out of my van, and saw the fireman running back. I said, "What's the matter?" and he said, "Give me your lamp." I said, "I can't, it's knocked out." He said, "The engine's off the road." I said, "Take the side lamp;" and he did so. I then lit my own lamp, and ran up the side of the train, and saw one carriage and the engine lying on their sides down the bank. I said to the fireman, "Where's the driver?" and he said, "He's under the engine." I got through the carriage, down the bank, and into the field on the other side, and called out to Mr. Field, one of the passengers in the front carriage which was in the field at the bottom of the bank, "Mr. Field, are you all right?" and he said, "Yes, guard, with the exception of my mother; get us a light and some brandy." I said, "If you are all right we will first get out the driver, who is under the engine;" and he said, "All right; we will wait abit." We got the driver out, after getting some earth away from his shoulder. I assisted in getting

him out, and said to him, "Are your legs broken, or anything?" and he said, "No, I don't think they are." I said, "Well, let's see if you can stand?" He said, "No, I can't stand;" and we then set him down on the bank, and I then ran for some brandy; and by that time a ladder had been obtained, and I got upon the top, and gave the brandy to Mr. Field, and got the passengers out—one at a time—of the leading carriage, which was in the field. The second carriage was off the rails, but not down the bank. The rest of the train remained on the rails of the siding. I was slightly hurt in the head and leg. Mr. Field's family, and a passenger of the name of "West," complained of being hurt, but no bones were broken. I gave the engine-driver the signal to leave the Princes Risborough station when I had finished my work. The starting signal was standing at "all right" as the train moved out of the station.

Dick Holloway, signalman, states:—I am a signalman in the employ of the Great Western Railway Company. I joined the service in January 1877 as porter at Aylesbury, and have been there until removed to Princes Risborough in July 1878. I went on duty at 9 a.m. on Friday, August 30th, and found all points, switches, and signals working properly. I had no occasion to pull off No. 4 starting signal for Aylesbury, and cannot say whether that was in proper working order or not. The 6.15 p.m. goods from Oxford arrived at 8.25 p.m., right time. I was on the ground, and Winch was on duty in the box. After putting the 5.50 p.m. goods from Taplow on to the branch for the 6.15 p.m. Oxford goods to pass, I went up with the 6.15 p.m. Oxford goods, and opened the points marked "C" on plan, for the purpose of picking up one truck of goods. After doing this we backed the train on to the Oxford line clear of No. 11 points for the purpose of picking up the Aylesbury traffic. The Aylesbury goods train had arrived in the meantime, and the engine was put in the branch bay siding. We went clear of No. 15 points and past the points leading to the dead end siding. We then took these wagons, and put them on to the goods train, which was standing on the main line. We then came on to the branch again, and I unlocked the points leading to the dead end, marked "E" on plan, and we put in eight trucks. The engine was then unhooked and sent ahead. I went and locked the stop block to prevent the trucks running out of the siding. I then went and assisted in pushing the break-van of the Aylesbury train clear of the crossing to allow the Aylesbury engine to come out of the branch bay siding, and then unlocked the points "F" to allow the Aylesbury engine to pass out on to the branch line; reversed the points, and the engine backed on to the van, and went away to Aylesbury. I then locked the points marked "F" on plan. On my way back to the signal cabin I forgot to reverse the points marked "E" leading to the dead end siding, and to lock them. I went into the box, and hung the keys up in their usual place, making a remark, "There's the keys all right, Winch; good night." I do not remember whether Winch asked me if I had locked up the points securely.

George Winch, signalman, states:—I am a signalman in the service of the Great Western Railway Company. I have been a signalman 18 months. I came on duty at 8 p.m. on the evening of Friday, August 30th, and found all my points in good order, and signals working properly. I had not time to examine the ground points after the departure of the Aylesbury goods and the arrival of the 9.5 p.m. passenger train from Maidenhead. When the day signalman, Holloway, left duty at 9.9 p.m., he brought me the keys of the siding points marked "E" on the plan. I asked him if he had locked the points, and left them safe, and he informed me that he had done so; and I took it for granted that such was the case. On the

arrival of the 9.5 p.m. from Maidenhead, I put my home-signal (No. 2) to danger, and then pulled over Nos. 11 and 15 points, and then pulled off No. 4 branch starting-signal. The signal worked properly, and I found no difficulty whatever in pulling it off. I then left the box to change the staff, and the train started at 9.55 p.m., being 5 minutes late. I then went on to the platform to deposit the staff and receive the keys of the booking office, but had not got quite so far when I heard a crashing noise. I tapped at the window, and spoke to Mr. Allen (the station master) through the window that the Aylesbury train had run into something, and then went off at once to see what was the matter. I could not see anything at first, for the steam, smoke, and dust; but the first man I saw was the fireman. He said to me, "My mate is under the engine; come and help me get him out." I crept through between the engine, which was on its side down the bank, and a coach, which was also on its side and down the bank. I found driver Collier underneath the engine, and we tried to release him, but could not. He said, "Dig some earth away from my shoulders;" and to his mate, "Charley, dought the fire." His mate said he would first get a shovel and dig him out. I, having the Wycombe and Princes Risborough staff in my hand, moved the earth as much as I could, and guard Lansdown came to my assistance, and we pulled "Collier" out. After that I got a ladder, and helped to release the passengers from the coaches. The 6.15 p.m. goods from Oxford had put off some loaded wagons into the branch siding, but these points had been worked by signalman Holloway; I working the levers in the box, pulling over Nos. 11, 15, and 17 points during the shunting. We do not often use the branch dead end siding, but were compelled to do so on this occasion in consequence of the down long siding being full.

George King, linesman, states:—I am a linesman in the service of the Great Western Railway Company. My duties are to attend to the locking apparatus in my district, which begins at Cookham and ends at Kennington junction near Oxford. Princes Risborough is one of the stations I have charge of. On August 18th I tested the locking apparatus at Princes Risborough, and it was in good working condition. On Wednesday, the 28th of the same month, I was doing some work near the goods shed, and I looked through the yard afterwards. I oiled the bolt lock of No. 4 points, which are the points by which the train ran into the siding and met with the accident. They appeared to me to be in good order at the time. I did not test it, as I had not time to do so. I did not observe anything wrong about it, or the guides through which the locking bolt works. New switches were put in at this station in March last, and the whole bolt-locking arrangement was at that time relaid and put into thorough working order. I reached Princes Risborough about 7.20 a.m. on the morning after the accident. I went and examined the locking of the No. 4 point, and found one of the guide plates was loose, so that the bar which works between the guide plates, and by which the points are locked, could be pushed out of its place by the locking bolt when the signal was lowered. The guide plate at this time was fixed with coach screws. The two coach screws which fastened the guide plate were not pulled out of the holes, but they were pushed sideways against the wood. They were not quite loose in the holes. The coach screws are $\frac{1}{2}$ inch thick by 5 inches long. I produce one of the coach screws which is bent. It was the one nearest to the switches in the loose guide. I have been about 17 months linesman, and about 11 years in the Great Western Company's service. I took the screws out of the loose guide with a box spanner.

Conclusion.

It appears that previous to the arrival of the passenger train at Princes Risborough, a goods train from Oxford had arrived at Princes Risborough. The signalman (Holloway) who had been on duty during the day took the key, which is kept in the signal-cabin, to unlock the points of the sidings, and do the shunting that was required with the Oxford goods train. He first unlocked the padlock that secures the points of the siding on the west side of the Aylesbury line, and put in eight waggons. He placed the scotch block across the rails, to keep the waggons in the siding, and went to the north end of the yard, unlocked the padlock of another set of points, moved some vehicles at that end of the yard, re-padlocked the last-named points, and then took the key, with which he had unlocked the points, and replaced it in the signal-cabin. He forgot to lock the first pair of points that he had opened, and to place them in their proper position for trains going from Princes Risborough to Aylesbury. After replacing the key in the signal-cabin he left the station, his duties being finished for the day.

The points of this siding on the west side of the Aylesbury line are ordered to be kept locked with a padlock, and are further secured with a bolt, which is worked by a wire, attached to the lever that works the starting signal for Aylesbury. The travel of the bolt is only about $2\frac{1}{2}$ inches, and I found that when this bolt had travelled one inch, the signal was pulled up to all-right.

The inter-locking of the points and starting signal with this bolt is effected by a bar which is connected to the points and moves in two guides, through which the locking bolt passes to secure the points. On the morning after the accident one of these guide plates was found to be so loose that it could be pushed over along with the connecting bar of the points when the signalman pulled the lever of the starting signal, without his experiencing any difficulty, and while the points which lead to the siding were in the wrong position.

The man who relieved the day signalman and was on duty when the accident occurred was not aware that the points were wrong, as the key of the padlock by which they were usually secured in addition to the interlocking bolt had been brought back and replaced in its usual position. The signalman on duty, therefore, thinking that the points were in their right position, pulled off the starting-signal for the passenger train to leave Prince's Risborough for Aylesbury; and, owing to the defect in the fastening of the guide of the iron point rod, he was able to lower the starting-signal, by pushing the guide plate and point rod to one side, which he could not have done if the locking arrangements had been in good order. The linesman who has charge of this locking apparatus had examined it on the 18th of the month, and stated that he found it then in thoroughly good order. He had looked at it and oiled it two days previous to the accident, but stated that he had not time to try it, and did not perceive anything wrong about it. Whether there was anything wrong at this time, or whether the loosening of the screws which secured the guide plate occurred subsequently, I have been unable to ascertain.

The guide plate has now been secured by two through bolts, and cannot well get out of its place. But as the locking bolt only requires to travel about an inch to lower the starting-signal, this mode of locking cannot be depended on, and I would strongly recommend the re-arranging of Princes Risborough station and yard; that all the points and signals should be worked from raised cabins, interlocked with each other; and that the facing-points should be further secured with locking bolts and bars.

The accident was caused by signalman Holloway neglecting to replace the points of the western siding in their proper position, and to lock them after he had placed the waggons in the siding, and by the interlocking gear of this siding being loose, so that the signalman was able to push the rod connection which locks the points out of its place and lower the starting signal.

The Secretary
(*Railway Department,*)
Board of Trade.

I have, &c.,
F. H. RICH,
Colonel, R.E.

Printed copies of the above report were sent to the Company on the 7th November.

LANCASHIRE AND YORKSHIRE RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., 19th September 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 10th instant, the result of my inquiry into the circumstances attending a collision which occurred on the 2nd instant, at the Kirkgate joint station, Wakefield.

In this case, as the 8.45 a.m. Lancashire and Yorkshire down passenger train from Todmorden to Normanton was standing at the ticket platform, before entering Kirkgate station, Wakefield, it was run into from behind by the 9.40 a.m. Great Northern passenger train from Castleford to Kirkgate, Wakefield, which had come off the loop from West Riding junction, on the Great Northern line to Leeds, and on to the Lancashire and Yorkshire line at Ings junction.

The Lancashire and Yorkshire train consisted of tank engine, running coal box first, and five vehicles, including break-van in rear, coupled with Fay's break.

The Great Northern train consisted of tank engine, running chimney first, one third-class carriage with break compartment in front, one composite, and one third-class carriage with break compartment in rear, in which the guard was riding. The engine of this train was a four-wheel-coupled tank engine, with four-wheeled bogie in rear, and it was fitted with a vacuum break, with one break block to each driving wheel, and with a hand break to work the same blocks. The vacuum break was not fitted to the other vehicles in the train.

No passengers complained of injury, but the guard of the Lancashire and Yorkshire train was knocked down in his van and shaken, and has since been laid up.

The damage to the rolling stock was confined to the Lancashire and Yorkshire break-van, in which the headstock and the elevated window were broken.

There was no damage to the permanent way.

Description.

The Great Northern main line to Leeds running towards the north, crosses the Lancashire and Yorkshire line to Normanton running towards the east, on an over-bridge between 600 and 700 yards west of Kirkgate station, Wakefield, on the latter line. At about 300 yards north of this bridge, on the Great Northern line, is West Riding junction signal-box, where a loop leaves the Great Northern line and runs back to join the Lancashire and Yorkshire line at Ings junction. The facing points at West Riding junction are on the up line to the south, and the loop runs back on a 20 chain curve, and on a falling gradient of 1 in 100, for a distance of 600 yards to the Ings junction.

This junction is provided with the usual signals, but the only ones necessary to refer to are the home and distant-signal from the Great Northern line, which are 92 yards and 504 yards respectively from Ings junction, the latter being about 100 yards inside West Riding junction. Ings junction signal-box is between the junction points and the up home-signal, 30 yards from the former.

The west end of the ticket platform is 50 yards beyond the junction, and it extends up to Kirkgate station, a distance of 186 yards.

The point of collision was 74 yards from the west end of the ticket platform, on the down Lancashire and Yorkshire line, which is there nearly level and straight.

Both the main Lancashire and Yorkshire line and the Great Northern loop are worked on the absolute block system up to Ings junction, whence through the station station-yard working is in force. The signalman at Ings junction is, however, allowed to give "line clear" to West Riding junction when a train is standing at the ticket platform, which is only 150 yards beyond the junction home-signal.

Evidence.

William Hargreaves, signalman 18 years, states : —I have been all my time in charge of the signal-box at Ings junction. I came on duty at 6 a.m. on the 2nd instant, for an eight hours shift. At 9.58 a.m., I got the "be ready" from the hoist cabin, the preceding block station on the Lancashire and Yorkshire line, for the 8.45 a.m. train from Todmorden, due at

10.1 a.m. at Wakefield. I gave "line clear" at once; it was given "on line" at 10 a.m., passed my cabin at 10.1 a.m., and drew up to the ticket platform. I got the attention signal from West Riding junction-box at 10 a.m., and at 10.1 a.m., when the other train had passed, I acknowledged it, giving "line clear," and then at 10.1 a.m. I got "train on line" for the Great

Northern train from Milford junction to Kirkgate, Wakefield, due at 10.5 a.m. This train passed at 10.3 a.m. At that time all my signals were at danger, both ways. I was booking the train, and was looking out, and saw the Great Northern train coming past my home-signal. It was going at such a speed that I saw it was not going to stop until it had run past my box up to the ticket platform, where the other train was still standing. I signalled to the driver out of the window, at the same time calling out, but the train ran past the box and into the tail of the other train. I can't say whether the driver saw me, but I think the fireman did. The guard of the Great Northern train came to my box after the accident and asked me what I had been doing with my signals off. I told him to get away out of my box, as I hadn't had them off. The window of the cabin was shut when I signalled to the driver. It is not my practice to allow trains to pass my home-signal unless I lower it. I have sometimes given a hand-signal to a Great Northern engine and break, or goods train, in the other direction, in order to clear the junction, as I have no advance signal. I looked after the accident to see if my signals were standing at danger, and they were. They are in good order, and I can't remember having any complaint about them. There was nothing to prevent my taking the signals off for the Great Northern train, after the Lancashire and Yorkshire train had passed, and I had put the signals for that line at danger, but I didn't do so. The driver of the Great Northern train didn't whistle at all till after he had passed my box.

Samuel Carter, Lancashire and Yorkshire driver eight years, states:—I was driver of the 8.45 a.m. train from Todmorden on the 2nd instant, consisting of tank engine, running coal-box first, and five vehicles, with guards break-van at the rear. We ran past the Ings junction signal-cabin at 10 a.m., and pulled up at the ticket platform. We had been standing there from two to three minutes when the collision took place. I heard the whistle of the Great Northern train approaching, and was signalled by a ticket collector to move ahead. I tried to do so, but could not, as the breaks were on. The collision drove my engine forward about four or five yards, my steam being on at the time. I can't say what damage was done to the train. I didn't look back to see how the signals were after I had passed them.

John Wigfall, Great Northern passenger driver three years, states:—On the 2nd September, I was driver of the 9.40 a.m. Great Northern train from Castleford to Kirkgate, Wakefield. We left Westgate station at 10.2 a.m. The signals were all right at West Riding junction signal-box, and I passed that box at about 20 miles an hour. The Ings junction distant-signal was off, and also the home-signal. When I had got within a few yards of it, I saw it was at danger. My steam was shut off before getting to the West Riding box, and was still off. I was running steady, so as to be prepared as usual to stop at the ticket platform. Directly I saw the home-signal was at danger, I applied my vacuum break. The break did not act, because the cover of the valve for destroying the vacuum broke, so I went and applied the hand breaks myself, my fireman being away in front giving the engine some oil. This delayed me, and I was not able to get my engine reversed until just before I ran into the tail of the Lancashire and Yorkshire train, which was standing at the ticket platform. I cannot have been going above two miles an hour at the time I struck the van of this train. Nothing was broken in my train. There wasn't much damage done to the other train. My engine is a four-wheel-coupled tank-engine, with four-wheeled-bogie behind. It is fitted with vacuum breaks, with one break block to each driving wheel, and with a hand break to work the same blocks. The train was not fitted with vacuum breaks. I whistled for the guards' breaks as soon as I saw the signal on.

I gave three pops, and again three pops after I had got my break on. I had noticed the valve top to be cracked on my first trip that morning, but it had acted all right when I had used it on the same morning. The Ings junction home and distant signals were both off when I first saw them, which was before I passed the West Riding signal-box. I didn't keep my eyes on the home-signal all the way, so I can't say exactly when it was put on. I hadn't looked at it after passing the West Riding signal-box, and therefore not after passing the Ings junction distant-signal. I didn't see the Ings junction signalman waving to me to stop.

Levi Pantling, Great Northern passenger guard two years, states:—On the 2nd instant I was guard of the 9.40 a.m. Great Northern train from Castleford to Kirkgate, Wakefield, consisting of tank engine, one third-class carriage with break compartment, one composite carriage, and one third-class with break compartment in rear, in which I was riding. We left Westgate at 10.2 a.m. (by my watch), right time. As soon as we left I saw the West Riding junction signal all right for us, and before we passed the West Riding junction home-signal I saw the Ings junction distant and home signals off too. I didn't pay any more attention to the signals, as I was sorting my parcels. There was no whistle for my break until after my van had passed the signal cabin at Ings junction. My break was then slightly on, as it usually is at this place. I applied it harder. Almost immediately afterwards we ran into the tail of a Lancashire and Yorkshire train which was standing at the ticket platform. We were not going more than 3 or 4 miles an hour at the time, and would have pulled up easily at the proper place. After we had put the train into the siding at the station, I walked back to the signal-box, and as soon as the signalman saw me he said, "This is a bonny mess, isn't it?" I said, "It is. What did you do with your signals off?" He said, "I never pulled them off." I said, "Why I saw them off before I got to West Riding junction." He said, "That cannot be, because the Lancashire and Yorkshire train never passed my junction until you had been standing at West Riding 2 or 3 minutes." We were never pulled up at all at West Riding junction. The collision was at 10.4 to 10.5 by my watch. I didn't compare my watch with the signalman's clock.

Swan Mills, Great Northern signalman six years, states:—On the 2nd September I got "train on line" from Westgate south junction for the 9.40 a.m. train from Castleford to Kirkgate at 10.1 a.m., and I immediately called the attention of Ings junction, and offered him the "be ready." He didn't acknowledge for about half a minute. He accepted it before 10.2 a.m. I gave him "train on line" at 10.2 a.m., and the train passed me at 10.3 a.m. My signals were off for it before it left Westgate, and it was never pulled up at my box. I got "line clear" back again from Ings junction at 10.4 a.m. I didn't notice the Ings junction signals at all. I saw the Lancashire and Yorkshire train pass Ings junction at 10.1 a.m., just when I offered him the "be ready," and he gave me "line clear," as soon as it had passed the junction. I didn't notice the condition of the Ings junction signals. I can see them from my box. Occasionally like other signals they are out of order, but not more often than other signals. I did not observe that they were out of order on that day. I looked after the accident, and they were then in proper order. The Great Northern train passed me at the usual speed, that is about 10 miles an hour, I should think.

George Townsend, ticket collector at Kirkgate, in joint service of Great Northern and Lancashire and Yorkshire Railway Companies, states:—I was collecting tickets from the Todmorden train when I heard the whistle of the Great Northern engine. It

was then close at hand. I didn't hear any whistle before I signalled to the Lancashire and Yorkshire driver to move ahead, but he could not get the train started before the collision took place.

The Lancashire and Yorkshire guard was laid up from the effects of the accident and could not attend my inquiry; but his statement, and that of the Great Northern fireman, as given at the joint inquiry held by the officers of the two Companies, are as follows:

W. Beavers, Lancashire and Yorkshire passenger guard, states:—I was guard of the 8.45 a.m. train from Todmorden to Normanton. We arrived at the ticket platform, Wakefield, at 10 a.m. The signals were all off for us to enter the station. Whilst collecting tickets on the platform I was in my break at the rear of the train, which consisted of one 1st, one 2nd, two 3rds, and brake van (No. 78), all coupled. When I saw the Great Northern train approaching behind, as I thought at too great a speed, I applied my break for the purpose of preventing the shock. I had just got it on, and was in the act of putting on the strap on the break wheel, to keep it in that position, when I was knocked down, and the force slipped the coupling of the hook between my van and the next carriage. The headstock of the van and elevation window were broken, and the van was afterwards sent to Manchester for repairs. The Great Northern driver came to me after the accident and showed me something in his hand, like a piece of brass, connected with the vacuum break, and said

his vacuum had failed, and that was a portion of it. We had been about a minute at the platform before we were struck. There were about 20 passengers in the train, but none complained to me of injury. I heard that an Irishman told my driver at Normanton that his eye was bunged up, but nothing could be seen.

J. Cammell, Great Northern fireman, states:—After we left Westgate I saw the West Riding junction signals off, and went round to oil the engine. I am not certain about the distant signal for Ings junction, but I saw the Ings junction home-signal on when we were close on it. The driver told me that the signalman at Ings junction had put his home-signal on again. I put on the hand break and skidded the wheels. I saw the signalman put out his arms in the box. I do not know when the vacuum break on the engine failed, only I saw my driver doing something with it when he called out to me to put on my break.

Conclusion.

The evidence in this case is so conflicting that it is almost impossible to determine who is to be blamed for this slight collision, for the signalman at Ings junction asserts that he never took off his signals for the Great Northern train, while the driver and the guard are equally positive that these signals were off when their train passed West Riding junction. The fireman of this train does not appear to have noticed the signals at all until close to the home signal, which was then at danger; but his evidence, so far as it goes, tends somewhat to support the statement of the signalman, and on the whole I am more inclined to believe that the driver and guard of the Great Northern train were mistaken as to the state of the signals, than that the signalman, a man of 18 years experience, and of a good character, should first have been careless enough to take his signals off with the Lancashire and Yorkshire train standing under his eyes, and then, having thrown them up again, should have deliberately lied about it; for in his case there can have been no doubt in his own mind as to what he had or had not done. Moreover, the driver of the Great Northern train admits that he never looked at the Ings junction home-signal after he passed West Riding junction, that is even before he had arrived at the distant-signal, although it was full in view of him for over 500 yards, and that when he did look, on getting close to it, it was at danger. This was undoubtedly very careless conduct in approaching a junction near to a busy station, and for this he is much to blame, whatever may be the case with regard to the signals. The guard and fireman should also have been looking out, instead of in the one case sorting parcels, and in the other oiling the engine.

In order to guard against such an accident in future, I consider that the signalman at Ings junction should not give "line clear" on either the loop or the down main line, so long as a train is standing at the ticket platform, and I cannot see that any inconvenience will be caused by this, if the West Riding junction box be provided with an advance starting signal on the loop, which would enable the signalman there, when he had not got "line clear" from Ings junction, to clear his junction in the usual manner, by letting a train go on to the loop up to to the advance starting signal after bringing it to a stand at his home signal. The trains working on this loop are I believe so short that there would be no occasion to move the Ings junction distant signal, but that an additional arm on this post could be placed for an advance starting signal; but even if this post had to be moved the expense would be very small.

There is one point, however, to be considered with regard to this accident, which is of far more importance than the question as to which of the companies servants is immediately responsible for it, for it appears that the collision would not have occurred at all had it not been for the failure of the vacuum break on the Great Northern engine. At the point where the driver of this engine first saw the home-signal against him he was at least 216 yards distant from the point of collision, and

he cannot have been going more than 10 miles an hour, for he knew that he had to stop at the ticket platform, and states that he was prepared to do so. There can be no doubt therefore that if it had not been for the loss of time, due to his first trying to put on his vacuum break, and then having to resort to his ordinary hand break (his fireman not being available at the time), that he would have been able to stop his train in time to avoid the collision, when it is remembered, that even as it was, with only the hand break on, he had reduced his speed to two or three miles an hour when the collision occurred.

It should further be remarked that this driver had apparently no means whatever of knowing that his vacuum break would not act until he tried it, and that the consequences, had he been depending upon this break for a stop when running at a high rate of speed with a train fitted throughout with vacuum break, might have been very serious. This accident therefore furnishes a very strong argument in favour of all continuous breaks being automatic, and so providing a continual tell-tale as to their being in an efficient state or otherwise.

I have been favoured by the Superintendent of the locomotive department of the Great Northern Railway with a sketch showing the injury to the valve which failed to act. This valve is the relief valve for admitting air to the break pipes, and so destroying the vacuum, and releasing the breaks, and it has a brass flap-top $\frac{5}{8}$ of an inch in thickness. This flap-top was broken across near the hinge and fell off, and consequently the air had free access to the pipes, and the vacuum necessary for applying the breaks could not be obtained. It is stated that the damage was caused by "bad usage, unknown to the driver;" but it is worthy of consideration whether this all important piece of brass casting should not be made stronger, and so protected that it would be safer from damage from either accidental or wilful bad usage.

I have, &c.,

The Secretary,
(Railway Department,)
Board of Trade.

F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Lancashire and Yorkshire and the Great Northern Railway Companies on the 5th October.

LANCASHIRE AND YORKSHIRE RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., September 19th, 1878.

I HAVE the the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 7th September 1878, the result of my inquiry into the causes of a collision which occurred on the 2nd inst. near Middleton junction, on the Lancashire and Yorkshire Railway.

In this case, a pilot engine which was following a special passenger train in order to assist it up a steep incline from Middleton junction to Oldham, came slightly into collision with the tail of the train.

Three passengers complained of being shaken, but there were no serious injuries, and no damage to either rolling stock or permanent way.

The train consisted of engine and tender, five coaches, coupled with Fay's break to the break compartment of the front coach, and four loose third-class coaches in rear of the train.

The collision took place at about 5.45 p.m.

Description.

At Middleton junction, about $5\frac{1}{2}$ miles from Manchester, the Oldham branch leaves the main line from Manchester to Rochdale, which here runs nearly straight in a north-easterly direction, on a 15-chain curve to the east, the facing-points being on the down line.

The station is on an island platform in the angle between the main and branch lines, with additional platforms on the outside of both lines. The south-west end of the island platform is 80 yards north-east of the junction, and it extends for 90 yards on the down side of the branch line. There are carriage sidings on the down side of the branch, the connection with the down branch line being 90 yards beyond the end of the platform, and 180 yards beyond the junction.

The main line and the branch line are level through the station, but the branch rises on a gradient of 1 in 124 from the end of the platform for a distance of three-quarters of a mile, and then on a gradient of 1 in 27 for a further distance of three-quarters of a mile.

The point of collision was 200 yards beyond the connection of the carriage sidings with the down branch line, about 300 yards from the down end of the platform, and about 400 yards from the point of departure of the tail of the train.

The following is the evidence given by servants of the Company:—

Evidence.

Mr. Thomas Hewitt, station-master at Middleton junction, states:—On the 2nd September a special relief train which had been arranged to work to Oldham as required, being Oldham Fair holidays, arrived here safely from Oldham at about 4.30 p.m. The train consisted of five coaches, coupled with Fay's breaks, and four loose third-class coaches. The break-van was at the Oldham end of the train and was included in the five coupled coaches. I put it into the siding to wait till required. I drew it out at 5.40 p.m. up to the Oldham departure platform, and filled it with passengers for Oldham. The loose coaches were then in rear. The guard came to me and asked me to allow the pilot to go behind, as it was not safe to have the loose coaches behind up the incline, which is 1 in 27. I concurred and told the driver of the pilot engine, which was standing in the carriage siding on the Oldham branch, to follow the train, after it had started, and to overtake it, being very careful how he approached it, and also to be very careful how he left it at the summit of the incline so that nothing might break loose. I also told the guard to instruct the driver of his train to go steady until the pilot had overtaken him. I did not hear him do so, but am certain he did by the way the train started. The train started very steadily at not more than three or four miles an hour over the Canal Bridge, and the pilot started as soon as the points were right for him. He went off in my opinion recklessly, a good deal faster than he ought to have done. He shut off his steam and shut his cylinder taps just over the Canal Bridge, being then about 40 yards behind the train. He almost immediately applied steam again, but shut it off before he struck the train. I saw the collision but did not hear it. I was on the end of the departure platform about 300 yards off. The train went on and he followed it. I heard that one or two passengers complained of being slightly shaken. The engine I call the pilot engine is one usually here when heavy trains are running to Oldham, its duty being to assist trains up the incline. The custom

is for this engine to be coupled on in front of the train engine, but it has happened once before in the three years that I have been here that I have sent it behind for the safety of the loose carriages. As a rule the loose carriages are in front and the coupled carriages with breaks in rear. This train had been made up to run between Oldham and Rochdale where the incline is the other way, but in consequence of an influx of passengers during the day it was sent here. I did not change the make up of the train here because it would have been wrong again at Rochdale.

John Heywood, goods driver about two years, states:—On the 2nd September I was driver of No. 383 goods engine, six-wheel coupled, with six-wheeled tender. I came on at 9 a.m., and was sent to Middleton junction to pilot trains up the bank. I arrived there about 10 a.m. During the day I piloted several trains for Oldham up to Wernoth, and in all cases I was coupled on in front, until a special train for Oldham and Rochdale was starting at 5.40 p.m. When this train was ready I was in the carriage sidings east of the station, and the station-master told me that as there were loose coaches at the rear of the train I was to run up behind it to Wernoth. He said, "You must be very careful how you leave them at Wernoth." I did not hear him say anything about being specially careful how I started, but he may have done so. When the trains had passed the points I whistled, and the siding signal was taken off for me to go out. I started very carefully, and shut off steam and started again two or three times before I came to the train. The train was going very slowly, not more than walking pace, and I was not going much faster, but I miscalculated the speed a little and came slightly into collision with the train. There was no damage to either engine or train. I do not blame anybody in the matter, except myself. In former days I have often had to run out in this manner, but not since the last rules came out.

The guard of the train was not present at my inquiry, being away on leave, but his report of the case agrees in all respects.

Conclusion.

This slight collision was due to an error of judgment or careless driving on the part of the driver of the pilot engine No. 383. The man frankly admitted that he alone was to blame, and there is no doubt that it is a difficult operation to bring an engine up to the tail of a train in motion, and one which a driver should never be called upon to perform in the case of a passenger train.

There is a special rule in the Lancashire and Yorkshire book of regulations to the following effect:—

"Two trains must not be coupled together . . . ; nor must pilot or other engines be coupled behind trains, but when an extra engine is required to assist a train it must be attached to the front of the train, except in cases of unavoidable necessity, and when instructions to the contrary are given by the passenger superintendent." Since the publication of this rule I am given to understand that the practice, which has been so often condemned, of banking up trains from behind has ceased to obtain on this line in the case of passenger trains.

In this instance I consider that the station-master exercised a wise discretion in departing from the rule, being under the necessity of despatching a train up the very

unusually steep incline of 1 in 27, with four loaded carriages at the tail of the train, and having no break-van to attach behind them. He ought, however, most certainly to have stopped the train as soon as it had passed the points of the sidings, so that the pilot engine might be brought up to the tail of the train while it was at a stand, and he is in my opinion to be blamed for not having done so.

I have, &c.,

The Secretary,
Railway Department, Board of Trade.

F. A. MARINDIN,
Major R.E.

Printed copies of the above report were sent to the Company on the 1st October.

LANCASHIRE AND YORKSHIRE RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., 23rd September 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 7th instant, the result of my inquiry into the causes of a collision which occurred on the 3rd instant, at Sowerby Bridge station, on the Lancashire and Yorkshire Railway.

In this case, as the 6.0 p.m. up train from Normanton to Manchester, consisting of engine and tender, and six carriages, five of which were coupled to the rear break-van with Fay's break, was approaching Sowerby Bridge station, where it was timed to stop at 7.15 p.m., it ran into a train of three empty carriages which had been let down without any engine on the Ripponden up branch line, and having run past the siding points, had fouled the main line at the junction points at 7.22 p.m. Three passengers complained of injury, but none were seriously hurt. The break-van attached to the empty carriage train was smashed to pieces, and the ends of the next carriage broken, and on the engine of the up train the funnel was knocked down, and the buffer beam slightly damaged.

There was no damage to the permanent way.

Description.

At Sowerby Bridge the Lancashire and Yorkshire main line, as it runs through the station from east to west, up to Manchester, is nearly straight and level. There are platforms on each side of the two main lines, a dock on the outside of the down platform, and a through loop on the outside of the up platform. Outside this through loop again there is the main platform and the station buildings, with a dock for the reception of the Ripponden branch trains.

The junction of the Ripponden branch, a double line, is about 60 yards east of the east end of the down platform, and this branch diverges at an easy curve to the south-west, the facing-points being on the up line.

The up through loop leaves the up branch line and crosses the down branch line to the right, about 40 yards from the junction, and 50 yards further along the branch the Ripponden dock line is brought out across both branch lines to join a shunting neck having a double line of rails, which form a double junction with the branch about 50 yards still further along it.

This shunting neck has been arranged so that the branch trains are not brought on to the main line at all, but on arriving are run into the neck, and then backed across the branch line into the dock. After they are emptied they are drawn out again into the shunting neck, so that the engine may get round the train.

The branch falls on a gradient of 1 in 103 towards the junction. The main line on approaching the junction is level, and runs through a rock cutting on a slight curve. The driver of an approaching engine has a good view of the junction signals, but cannot see the line at the junction until he comes out of the cutting, about 160 yards from it.

The signals and points are worked from Ripponden junction-box, containing 40 levers.

Evidence.

William Sutcliffe, signalman 20 years, states:— was built, two years ago. On the 3rd September I have been at Sowerby Bridge for nearly 20 years, came on duty at 6 p.m. for 12 hours. At 7.16 p.m. and have been in charge of the junction-box since it the Ripponden train, due at 7.12 p.m., arrived on the

branch and ran into the shunting neck, and back on to the platform as usual. It drew out across the branch into the shunting neck for the purpose of the engine getting round the carriages. There were some goods waggons there which prevented the engine from doing this in the usual way through No. 12 points; it therefore backed the carriages through No. 24 points on to the up branch main line past No. 25 points. The engine was then detached and run into the engine loop through No. 25 points, and as soon as this was done No. 25 points were pulled over, and the carriages left on the up branch while I went to attend to my signals for a main line up train. While I was doing this the foreman porter who was in charge of the carriages let them down before No. 24 points were set for him, and consequently they ran back foul of the main line. Just as they were coming to a stand the 6.0 p.m. up train from Normanton to Manchester, due at Sowerby Bridge at 7.15 p.m., for which my signals were off to run into the loop, came up, and into collision with the carriages. This train had to stop at the station, and was only going about eight miles an hour at the time. I had no time to put up any signals to stop this train, as I didn't see the empty carriages running back until they were right opposite to my box. There is a disc-signal working with No. 24 points, and the carriages should not have been let down till the signal was off. I have never hand-signalled them on this operation before, either for engines or carriages. I might have given a hand-signal on this occasion, but I don't think I did. I ought to have set No. 24 points at the same time as No. 25, but I forgot to do so when I went to look after the up main line train. I got the up train on line from Milner Royd at 7.21 p.m. I had had the "be ready" at 7.19 p.m., and I took my signals off for it at the same time. At that time the branch train of empty carriages was on the branch line. The collision did not damage the up train at all, and only damaged the break compartment of the empty carriages. The collision took place at 7.22 p.m. It was daylight at the time. I am quite certain that I had taken off the signal (No. 7) for the loop before the Ripponden carriages had run back through No. 5 points. I had taken my signal off as soon as the first part of the train had passed at 7.19 a.m. No. 5 points must have been right for the loop, and the Ripponden carriages must have forced them open in running back through them. I didn't examine the points afterwards, so I cannot tell whether or not they were sprung. The engine of the train was about 30 yards beyond the home-signal when I threw it up again. The home-signal is about 100 yards from my cabin.

Giles Latchford, foreman porter at Sowerby Bridge, 13 years in the service, states:—On the 3rd September I was working as guard of the Ripponden branch train. It arrived at the branch platform in the usual way at 7.16 p.m., and, after setting down the passengers, it drew out into the shunting neck as usual for the engine to get round the carriages. Owing to some waggons it couldn't do this in the usual way, and was therefore backed out on the up branch line. The engine being detached set back into the engine loop through No. 25 points. I was in the break com-

partment of the van which was next to the engine on coming down from Ripponden, and therefore at the end of the train nearest to the junction as we were then standing. I kept the break on until I got a hand-signal from the signalman to let down the carriages. I then took my break off in order to let them down into the shunting neck, but No. 24 points had not been set, and we ran back foul of the main line. I had been only a month here at the time, and I didn't know the points very well, and it was dusk at the time, so that I never found out that I had run past No. 24 points until I saw the head light of the Normanton train coming on the up line, only about 30 yards off. I was then foul of the main line. I jumped off, and was not hurt. The break carriage was completely smashed, and both ends of the next carriage were staved in. Only the break carriage was knocked off the rails. I was only coming down about a walking pace, and had nearly come to a stand when the collision occurred. If I had seen that I had passed the proper points I could easily have pulled up before fouling the main line, but not before fouling the loop up which the train was coming. My train of empties consisted of third-class carriage with break compartment in front, one composite, and one third-class in rear. They were coupled with Fay's break. I didn't know there was a disc-signal for going through No. 24 points. I have done the same thing before, and have been hand-signalled. I didn't look at No. 5 points when I was running back, but they must have been right for the branch and not for the loop, or I must have felt when we went through them that I was forcing them open. I was just moving when struck. My break was slightly on.

Joseph Redman, passenger driver three or four years, states:—On the 3rd September I was driving the 6.0 p.m. up train from Normanton to Victoria, consisting of engine and tender, and about six carriages. The five rear carriages were coupled with Fay's break to the break compartment in rear, and there was one loose carriage. I had only a tender break, with one block to each of the six wheels. My engine is a four-wheel coupled engine with six wheels. We left North Dean about right time, and were stopped at Milner Royd cabin for a couple of minutes, after which the distant-signal from Sowerby Bridge junction was against us. We proceeded gently past the distant, and found the home-signal right. My steam was off. It had been taken off when I saw the distant-signal against me. I let the train come slowly on into the station, and when coming round out of the cutting I saw there was an obstruction on the line. I reversed my engine and got steam on against her, but had no time to whistle for the guard's break. We ran into the carriages which were put off the main line, smashing up the break-van. The funnel of my engine was knocked down, and the buffer beam splintered a little. The shock did not seem much to me. It didn't damage me in any way. I heard of one small child being a little hurt, but there were no other complaints that I know of. I was going about five or six miles an hour, having to pull up at the station. None of the vehicles of my train were off the rails. I didn't see the obstruction on the line more than 40 or 50 yards off.

Conclusion.

From the foregoing evidence it appears that upon this occasion the Ripponden branch train having been drawn out into the shunting neck, after being emptied, the engine was unable to get round the train in the usual manner, owing to a cross-over road on the shunting neck being blocked by some waggons. The train was, therefore, backed out on to the up branch line, and the engine, being detached, was run into a siding, so that the train might be let down past it, and into the shunting neck again. The points leading thereto were, however, not set right, and the train running back past them, and through the points of the loop line, fouled the main line at the

junction, just as the 6.0 p.m. up train was approaching, with the signals off for it to run into the station.

This accident was, therefore, due principally to the carelessness of the signalman at Ripponden junction-box, in giving a signal for the branch train of empty carriages to be let down without first setting the points right for it to run into the shunting neck.

The foreman porter who was acting as guard of this train ought to have seen that the road was set right for him, and the disc-signal off, before he started the train back, and he also is much to be blamed for not having done so. He pleads that he had only been a month at the station, and didn't know the different points, but in his position he ought to have made it his duty to know all about them, and, had he done so, he could not have failed to perceive that his train had passed the proper points, when, with the powerful break at his command, he might have stopped his train in time.

The driver of the passenger train states that he had no time to whistle for the guard's breaks, as he only saw the obstruction on the line about 40 or 50 yards off, but, the point of collision being visible for 160 yards, and it being only dusk at the time, he cannot have been keeping a very good look-out. Had he been doing so and sounded his whistle, the train might easily have been stopped by the powerful continuous breaks in the hands of the guard, although, judging from the effects of the collision, the speed of the train was undoubtedly higher than the driver estimates it at, viz., 6 miles an hour.

Even as it was, with only 50 yards to act in, the train might have been stopped, or nearly so, had the power of instantaneously applying the breaks to the whole of the train been in the hands of the driver, a most essential condition for an effective continuous break.

The cross-over road on the shunting neck ought never to be allowed to be blocked up by waggons, for this neck was laid out expressly to avoid the necessity of any such dangerous operation as letting down a train of carriages without an engine, on a heavy falling gradient towards a junction.

In order to prevent the possibility of an accident of this kind in future, No. 24 points should be altered so as to lie in their normal position right for the shunting neck, and so form a trap for the up branch line; they should precede No. 8, the up branch home-signal, and when pulled over should lock Nos. 2 and 7, the up main and up loop home-signals.

The Secretary,
(Railway Department),
Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major R.E.

Printed copies of the above report were sent to the Company on 15th October.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade (Railway Department),
17th July 1878.

SIR,

IN compliance with the instructions contained in your minute of the 8th ultimo, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the collision that occurred on the 31st May last at Bolton station on the London and North-Western Railway.

The 5 p.m. passenger train to Manchester as it left Bolton station platform ran into a coal train.

The passenger train consisted of a tank engine running with its coal bunk in front, a third-class break carriage, four passenger coaches, and another third-class break, in which the guard in charge was travelling. All the coaches on the train were fitted with Clarke and Webb's continuous breaks. The coal train consisted of a shunting engine and 14 empty and loaded coal waggons. This coal train was being pushed back, from the line on which the passenger train was to run, into No. 4 platform line, which is adjacent to No. 3 line from which the passenger train started.

Bolton station is worked and controlled from a raised signal-box at the south end of the station, and each platform is provided with a starting-signal which is interlocked with the points.

On the day in question, at 5 o'clock, the engine-driver of the passenger train got the signal from the guard in charge, that the train was ready to start, the guard was standing near the tail end of his train at the time, and as the train started at once the guard jumped into his van and began attending to his parcels.

Immediately afterwards he heard the engine-driver give one whistle. He ran to the window of his van, and as he looked out, he felt the shock of the collision and was knocked down in his van and slightly cut on the cheek. Two passengers were slightly injured. One buffer casting of the passenger engine was cracked, one waggon of coals was broken and knocked off the rails, and two empty coal waggons were damaged.

The evidence is as follows :—

Joshua Jones, driver of 5 o'clock train, Bolton to Manchester on May 31st.—At 5 o'clock the guard gave me the signal from the back end of my train to start; my engine was about 30 yards back from the starting-signal, which was on my left, and I was on the right side of my engine and looking out to get the signal that the station work was completed, and that I might start. On getting the signal from the guard I gave three whistles to call the signalman's attention that I was ready to start and to get the signal. I then put steam on my engine and as it moved slowly ahead a permanent way inspector ran up to get on the engine, and as I turned round again to look for the signal I saw that the signal was against me, and that a train of empty waggons was being pushed back off the road on which I was travelling into No. 4 platform line, I whistled, pulled the cord of the continuous breaks, and did my best to stop, but could not do so before I struck one of the empty waggons of the coal train, which was knocked off the road and the cast-iron buffer of my engine was cracked. My engine and every carriage of my train remained on the metals. I had six coaches on. I have been an engine-driver about eight years, eight years fireman, and three years cleaner. I think my engine was moving about two miles an hour when I struck the coal train.

John Hickson, guard in charge of the 5 p.m. train, Bolton to Manchester, on 31st May.—At 5 p.m. I held out my hand to the driver of the train to show that I was ready for the train to start, and the train started. I jumped in my van and turned to attend to my parcels, and as I did so I heard a whistle, I ran to the window to look out, and as I did so I was knocked down in my van and slightly cut on the cheek. My train consisted of a tank engine running coal bunk in front, third-class break, four passenger coaches, and another third-class break at the tail end of the train in which I was travelling. When we started my van was close to the buffers at the station-house end of the platform, and the collision occurred when my van reached three parts down the platform. I have been a guard two years working into this station, and was not off work through the effects of the accident.

George Atkinson, station inspector London and North-Western Railway, Bolton station.—I was just at the end of the platform when the 5 p.m. passenger train started on the 31st May. My first notice of anything wrong was hearing the collision. I ran up the platform and found that one of the trucks of coal which was laden, and about the eighth waggon from the engine, was knocked off the rails and two other empty coal trucks slightly damaged; there were 18 waggons on the train, and two passengers complained of being hurt.

Eri Haworth.—I am a signalman stationed at Bolton. I have been signalman about 12 months in No. 1 cabin Bolton, which is close outside the station. I work starting signals for each of the four platform lines. I was on duty on May 31st when the 5 p.m. train started for Manchester. It was standing at No. 3 platform. When the signals are against a driver who wants to start he is supposed to give three whistles, but I did not hear the driver of the 5 p.m. give three whistles on the day in question. I heard him give one, but I did not see where he was at the time. I could not take off my signal for No. 3, which he required, as my road was at the time set for No. 4, in consequence of a train of coal and empty waggons being shunted on to No. 4 line. The train of coal waggons had come out of the coal yard adjoining the station. I saw the engine of the passenger train strike the coal waggon, which I think was about five or six from the engine. The passenger engine was going very slowly at the time, and the coal train was being pushed in the opposite direction to the passenger train at about the same speed as the passenger train. I had called the driver of the coal train back by hand-signal and had made the road for him to put his train into No. 4 platform line. I let him out of the coal yard about six minutes to five. He then shunted some waggons into No. 4 platform line, drew out again and shunted some other waggons into the coal yard siding, but as this siding could not hold the whole train I gave the driver the signal to push back the remainder of his train into No. 4 platform line to clear the road for the passenger train.

Conclusion.

The accident was caused by the neglect of the driver of the passenger train, who left No. 3 platform at Bolton station while the starting-signal was standing at "danger," and while a train of loaded and empty coal waggons was being pushed backwards from the "up" line to Manchester into No. 4 platform line. His excuse for starting while the signal was at "danger" within a few yards of him, and while a coal train was close to him and plainly in sight, is, that his attention was attracted by a permanent way inspector getting on his engine immediately after he had started his train; but the mistake of starting his train while the signal was at "danger" had been committed before he saw the inspector. The engine-driver, who has been about eight years a driver on the London and North-Western Railway, bears a good character, but has been fined for the mistake he committed and for which there could be no excuse.

The signalman should not have allowed the line to be fouled by a coal train at the time the passenger train was just due to start. His excuse for doing so is, that the work of the station could not be done if he had not allowed the coal train to go on

with its shunting. The company's district superintendent who attended the inquiry did not think the signalman to blame.

The station accommodation at Bolton would therefore appear to be inadequate to the requirements of the place, if shunting on the passenger lines has to be carried on, until the passenger trains are due to start.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
F. H. RICH,
Colonel R.E.

Printed copies of the above report were sent to the Company on the 7th August.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade,
26th August 1878.

SIR,

IN compliance with the instructions contained in the order of the 24th ultimo, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances of the collision which occurred on the 20th ultimo at Edge Hill station, on the London and North-Western Railway.

A light engine from Lime Street, Liverpool, ran into a passenger train which was standing at the station. Twenty-two passengers are returned as having been slightly cut and bruised, and two or three more have since complained of injuries. None of the Company's servants were injured. The west end of Edge Hill station is about a hundred yards east of the mouth of the tunnel which extends thence to Lime Street station, Liverpool. There is a signal-cabin at the west end of the Edge Hill station platform, from which a home-signal at the mouth of the tunnel, and a distant signal about two hundred yards inside the tunnel, are worked by the signalman stationed in the cabin. The tunnel is also kept clear of smoke and steam by a fan placed at the centre of the tunnel, which is worked continuously from 6.30 o'clock in the morning to 11.30 in the evening. This section of the line is also worked on the block system, and no engine or train is allowed to start from Lime Street station until the last vehicle of a preceding train has passed the signal-cabin at the west end of Edge Hill station.

On the day in question the 8 p.m. train from Lime Street, which consisted of a train for Manchester in front, and a train for Bootle, which was connected to the Manchester portion, left Lime Street at 8.2 p.m. It was drawn by two engines, which were placed in front. "Line clear" was given to Lime Street when the Bootle and Manchester trains arrived at Edge Hill, and a light engine was allowed to leave Lime Street station at 8.8 p.m., the driver being told by the signalman on duty at Lime Street to make haste, as he was only two minutes in front of the train due to leave Lime Street at 8.10 p.m. This light engine ran into the last vehicle of the Bootle train, which was still standing at the Edgehill station platform when the light engine reached it. The Manchester portion of the train had already left Edge Hill for Manchester at the time of the collision. No vehicles were thrown off the rails, and no injury was done to the rolling-stock or permanent way. The signals at the mouth of the tunnel and inside the tunnel were at "danger" when the light engine passed them, but the engine-driver missed seeing the distant-signal altogether, and only saw the home-signal at the mouth of the tunnel when he reached it.

The evidence is as follows :—

Wm. Lomax, guard of the 8 p.m. Bootle train on the 20th July, said :—"I left Lime Street at 8.2 p.m. The Bootle section of the 8 p.m. train, to which I belong, consisted of seven coaches, one being a third-class brake, in which I rode, at the end of the train. I heard the light engine approaching, and jumped from my van. I was not hurt. My van was standing at the sloping end of the platform when the light engine struck it. None of my coaches were damaged. About 15 or 16 of my passengers complained of being injured."

Horatio Ogden, signalman at No. 1 box, Edge Hill, on 20th July, said :—"I have been signal-

man for the last three years. I was on duty when the 8 p.m. trains from Lime Street arrived at Edge Hill. They arrived at 8.7 p.m., the Manchester train being in front, and the Bootle in the rear. After seeing the tail lamp on the last vehicle, I immediately gave "line clear" to Lime Street, having previously put on my distant and home signals. At 8.8 p.m. a light engine was given on from Lime Street. I did not interfere with the signals, but heard the light engine approaching, and thought the driver was coming too fast. I looked out of the window, when I observed the engine emerging from the tunnel, and the driver apparently doing all he could to stop, but he was unable to do so until he had struck the rear vehicle

of the Bootle train, which was opposite my signal-box. It was quite daylight, and I could see my stop signal distinctly. There was no steam or smoke emitting from the tunnel at the time. As I observed the driver was doing all he could to stop the engine I did not exhibit a red flag. The engine was running tender first. The collision occurred at 8.11 p.m. I spoke to the driver, and he appeared to be sober. There was a fireman on the engine. There was a tail lamp on the Bootle train. The light engine struck the Bootle train pretty hard. I cannot say at what speed, but nothing left the rails."

James Stewart, station-master, Edge Hill, said :— "I was on duty on Saturday night last, when the 8 p.m. trains from Lime Street arrived at Edge Hill. The Manchester portion was in front, and was duly despatched to Manchester, after which the engine came out of the siding to back down to the Bootle train, and whilst this was being done I heard the engine approaching from Lime Street. I noticed the stop signal was at "danger," and expected the driver would pull up at it. I observed the engine coming out of the tunnel, and thought the driver was coming too quickly, and therefore held up my arms, (standing at the end of the platform,) and motioned and whistled for the driver to stop, and he appeared to be doing all he could to bring the engine to a stand, but was unable to do so before the collision took place. This was about 8.11 p.m. I did not notice any steam or smoke coming out of the tunnel. I have seen the stationary engine-driver, and he tells me that the fan was kept working until 11 o'clock that night. I did not speak to the driver of the light engine. I have known him many years, and never knew him to be the worse for liquor. So far as I know he was sober on this occasion."

John Mansfield, driver of the 8 p.m. Liverpool to Bootle on the 20th July, said :—"We started from Lime Street at 8.2 p.m. and reached Edge Hill at 8.7. My engine, a tank, was in front. On my arrival at Edge Hill I detached and ran forward into the siding to allow the 8 p.m. Manchester train to go away. After the departure of the 8 p.m. for Manchester I backed out on to the platform line. My fireman was in the act of hooking my engine on to the train when I heard some one shout 'look out.' Immediately after the light engine struck the rear of my train. My engine was driven forward about three yards. No damage was done to my engine. I think the collision occurred about 8.12 p.m. The tunnel was perfectly clear when my train passed through it. My fireman was not hurt. I spoke to the driver of the light engine; he appeared perfectly sober."

Thomas Hardy, driver of light engine 737 on the 20th July, said :—"I arrived from Wigan at Lime Street at 8 p.m. with a train; after discharging the passengers, the station shunting engine drew out the coaches and I followed. My engine was backed down

No. 4 line. When the carriages were out of the way I was called out by one of the shunters, who told me we were two minutes in front of the 8.10 p.m. train, and I must make the best of my way up the tunnel. He also shouted the same to the signalman, and added, 'Let this light engine off No. 4 line and up the tunnel.' The signalman lowered the signal and came to the top of the stairs and motioned and shouted to me to 'wire in,' and held up his two fingers. 'Wire in' is a term commonly used, and means to get through as quickly as I could. I immediately proceeded and found the tunnel full of smoke and steam. I missed the distant signal from Edge Hill, not being able to see it for the steam and smoke. I did not find out where I was until half the engine had emerged from the tunnel mouth at Edge Hill. The fireman then applied the brake and I reversed the engine, steam was shut off at the time. The engine was running tender first, but I was unable to stop before striking the rear of the Bootle train, which stood just opposite No. 1 signal box. I don't think the fan was working at the time I passed through the tunnel. I did not observe the stop signal at the tunnel mouth till I was emerging from the tunnel mouth. I could not see it for smoke and steam. There was no light burning in it; it was daylight. I left Lime Street at 8.8 p.m., and the collision occurred at 8.11. I have been a driver 15 years, and this is the first accident of the kind I have been in. I went to work at 6.30 a.m. and had been on the engine all day. I had no stop that day except 3.30 to 4.30 at Lime Street."

Andrew McDevitt, signalman at No. 2 box, Lime Street, 20th July, said :—"I was on duty at Lime Street at 8 o'clock on Saturday night last. The Bootle train left about 8.2 p.m. I remember the light engine, it was in the bottom of No. 6 line. The shunting engine drew up the coaches clear of the points and put them back into the new station. The light engine which had followed the coaches out was backed into No. 4. At 8.8 I ordered the driver of the light engine to proceed to Edge Hill as quickly as possible, and told him that he had only two minutes advance on the 8.10 train. We should have hooked him to the 8.10 p.m. train in the ordinary course, but it was not convenient to do so, owing to coaches being in the way. I believe I used the expression 'wire in,' or something to that effect. As far as I could see there was no particular amount of smoke or steam coming out of the tunnel."

Thomas Parry, stationary signalman at the Fan House, Smithdown Lane, on the 20th July, said :—"The fan engine was working continuously from 6.30 p.m. to 11.30 p.m., and only slowed between trains. I received the signal of the departure of the 8 p.m. passenger train from Lime Street and put on the fan at full speed, and it remained so until 8.25, it being kept on at full speed for the 8.10 p.m. train."

The accident was caused by the neglect of the driver of the light engine. This man has been fifteen years an engine-driver in the Company's service, and bears a most excellent character, this being the first accident of the kind in which he is reported to have been to blame.

The Secretary,
(Railway Department),
Board of Trade.

I have, &c.

F. H. RICH,
Colonel R.E.

Printed copies of the above report were sent to the Company on the 20th September.

LONDON AND NORTH-WESTERN RAILWAY.

SIR,

Holyhead, October 30th, 1878.

IN compliance with the instructions contained in your minute of the 4th ultimo, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the collision that occurred on the 31st August last at Holyhead station on the London and North-western Railway.

Twelve persons were returned by the company as having been slightly shaken, but only one of these, who was cut on the forehead, has made any complaint since the accident.

The 10.30 p.m. train from Chester left that station about 20 minutes late, and arrived about 22 minutes late at the ticket platform at the east end of Holyhead station.

The train consisted of two engines and tenders, a covered carriage truck, a third-class, a parcels van, a break-van with guard, two composites, a third-class, another break-van with the guard in charge, a third-class, three composites, two third-class carriages, four composites, two thirds, a second-class, and a break-van with another guard. The vehicles were coupled together in the order in which they are given.

As soon as the train drew up at the ticket platform, the engines were detached, ran forward, and were turned by a cross-over road on to the up line to go back to the sheds, but as the second engine reached the place where the crossing between the up and down lines intersects the down line, the tender struck the carriage truck, which was the leading vehicle of the passenger train which had followed the engines down the incline. The tender of the engine was slightly damaged, the carriage truck was much damaged, and the two leading wheels of this truck were thrown off the rails.

The ticket platform at Holyhead station is about 140 yards east of the station platform. It is situated on a gradient of 1 in 90, which extends about 40 yards west of the platform, and about a quarter of a mile east of the ticket platform.

The signalman's hut, which is called No. 2, whence the points and signals are worked, is about 38 yards west of the ticket platform and the points through which the engines were turned from the down line to the up line are close to the west side of No. 2 cabin.

Evidence.

1. *Peter Lever*, inspector, Holyhead, states : I was on duty when the 10.30 p.m. passenger train from Chester arrived at the ticket stage at Holyhead at 1.15 a.m. on the 31st August, and as soon as it came to a stand I and others commenced to collect the tickets. I had collected one compartment of the fourth or fifth carriage from the engine, and the train then began to move towards the station. I called out down the train for the breaks to be put on, and the train immediately stopped before it was struck by the engine. The train had moved about two carriage lengths. I then ordered Shunter Richard Owen to go to the front and see the road was clear and get the shunt engine on the train. Before he could get there the collision occurred. I did not see the collision as I was at the time collecting tickets in the fourth carriage from the engine. The front guard's van was the third vehicle from the engines, of which there were two on the train. I cannot say who collected the tickets in the third-class coach, that was the second vehicle from the engines. I have been three years inspector at Holyhead, and 30 years in company's service. I saw the guard in leading break coach as he passed me in his van. When I saw the train moving I went towards the guard's van in the centre of the train to get the break on, and told Owen, the shunter, to run towards the front and see that the train had not fouled the up line, but the accident occurred before Owen had time to get there. The two engines were returning on the up road to the engine shed, they were coupled together.

2. *Richard Owen*, shunter, Holyhead, states : I was on duty at the ticket stage when the 10.30 p.m. from Chester arrived at 1.13 a.m. on the 31st August. I was collecting tickets in the fifth carriage from the engine. I observed the train moving and heard Inspector Lever and Foreman Evans calling out for the

break to be put on at once, as soon as the breaks were got on the train immediately stopped. Inspector Lever ordered me to the front of the train to see the line was clear, but before I could get there the engines had come in contact with the train. I have been employed as shunter at Holyhead for about four years. John Jones, porter, took the tickets in third-class coach that was second from the engines.

3. *William Roberts*, number taker at Holyhead, states : I was on the ticket stage when the passenger train arrived on the 31st August for the purpose of taking the numbers of the vehicles. I was taking the numbers when I heard Inspector Lever call out for the breaks to be put on. I at once ran and got in the middle van and applied the van-break, which I found off. I have been one year number taker in company's service. I did not see any of the guards. I was standing near the guard's van about the middle of the train. I heard Lever call out.

4. *William Hawkins*, guard, joined train at Crewe : I was working in the rear van of the 10.30 p.m. passenger train from Chester on the night of the 30th August. We left Chester at 10.50 p.m., 20 minutes late with two engines and 22 vehicles on. We left Crewe late and were detained at Chester waiting for the Manchester and Liverpool portion. We reached the ticket stage at Holyhead at 1.10 p.m., 22 minutes late. When the train came to a stand I had my van-break on, but as soon as the train stopped I released the break and got out of my van. I was proceeding up towards the front of the train, the tail end of which extended some four or five carriages beyond the ticket stage, I was taking some valuable parcels and letters to the middle van. I usually wait before taking off my break to satisfy myself that the train is secure, and

trust to the middle break to hold the train while the engines are removed, and I fancied that the train was secured by the front and centre breaks before I took off my break and left my van on the 31st August. I have been a guard working to Holyhead between three and four years. Since the accident I am keeping my break on in whichever van I am doing duty until the engine starts the train from the ticket stage. There were two coaches in front of my van that were attached to it with the chain break.

5. *James Mountford*, guard, joined train at Euston, states : I was guard in charge of the 10.30 p.m. from Chester on 30th August. I rode in the van about the middle of the train. We left Chester 20 minutes late, with 22 vehicles on and two engines and tenders in front. There were two other guards in break-vans with the train, one in front and one behind. I had my chain break on, which was attached to two coaches in front of my van, when the train stopped at the ticket stage at Holyhead at 1.10 a.m. When the train had been brought to a stand, I took off by break and got out to get my insured parcels and letters for the boat, from the rear van. I depended upon the front van to hold the train. I saw the train commence to move, but it came to a stand before I could reach my break. I have been a guard 13 years. I had never worked before with the guard who was in the front van, but it was not usual with me to take off by break in the centre break-van. The guard in rear van has been with me in the same duty for about 12 months.

6. *Evan Evans*, fireman, Holyhead, states : I was on duty on the 31st August when the train arrived at the ticket stage about 1.15 a.m., and was assisting in the collection of tickets, when I observed the train move slowly down towards the station. I at once called out to the front guard who was walking slowly towards me to put on his break, which he at once did, and the train stopped. I was collecting in the fifth vehicle from the engine.

7. *Thomas Roberts*, signalman at No. 2 box, Holyhead, states : The 10.30 p.m. from Chester arrived at the ticket stage at 1.13 p.m. on the 31st August. The two engines were uncoupled from the train, I turned the points and they ran on over the points of the cross-over road. I then turned the points for them to go on the up line as usual and they proceeded. I could not see the train, but from the position of the engines when the train first stopped at the ticket stage I was satisfied the line was clear. I have been signalman at No. 2 box since it opened. My

signals and points are interlocked. My box is 58 yards from the ticket stage.

8. *John Jones*, porter at Holyhead, states : I have been in company's service about two years. I commenced to collect the tickets in the third-class carriage which was second from the engine, when the train drew up at the platform, and when I had finished collecting the tickets in the first compartment it had moved forward to the bridge where the leading carriage truck was struck by the engine.

9. *Reubin Roberts*, porter at Chester, states : I was acting guard in the front van of the 10.30 p.m. from Chester on the 30th August, and on my arrival at Holyhead at about 1.10 p.m. I had my van break with the chain breaks attached to two coaches behind it, and they were on until the train came to a stand. I then took off both breaks, got out and walked along the platform, and requested the passengers to have their tickets ready. I was not aware that the engines would be detached at the ticket platform as I had not previously worked to Holyhead with that train or any other. I was about two carriage lengths from my van when I saw the train moving and I at once ran to my van and put on first the patent break and then the van break, but this did not stop the train until it was foul of the up line. My van had not passed the ticket platform when I got back to it. My van was the fourth vehicle from the engines. I have been nearly 14 years in the London and North-western Company's service, and know the road between Chester and Holyhead.

10. *Edward Evans*, extra engine-driver : I have been about 12 years in the London and North-western Company's service. I took charge of the second engine which brought the 10.30 p.m. train from Chester and arrived at Holyhead ticket platform on the morning of the 31st August. The man in charge of the leading engine remained on it. My mate detached the two engines after the train stopped at the ticket platform. The two engines were run on the down line past No. 2 cabin, and were backed by the cross-over road on to the up line to go to the sheds. As my engine reached the place where the crossing intersects the down line the tender struck the covered carriages truck, which was the front vehicle of the train. The back foot-plank of my tender was slightly damaged ; the two leading wheels of the carriage truck were knocked off the rails, and the truck was damaged. We were running about two or three miles an hour. I could not see that the truck was foul of the road the engines were running on, as it was so dark and there was no light on it.

It appears that after the passenger train was stopped at the ticket platform the fireman of the second engine uncoupled the engines and tenders which went forward.

The three guards who were with the train took off their breaks, and got out of their break-vans as soon as the train stopped. There were breaks on the three vans, and chain breaks on two coaches next to each van, which were worked from these vans.

Immediately after the engines were detached, the passenger train commenced to follow them down the incline, and this was not noticed by the ticket collectors or the guards in charge of the train soon enough to stop the train and prevent the collision.

About 50 yards from the spot where the engines were detached the leading carriage truck was run into by the engines, which were returning on to the up road.

The accident was caused by the simultaneous carelessness of all three guards with the passenger train, who should not have taken off their breaks until after the work had been done at the ticket platform, another engine had been attached, and the train was ready to proceed to Holyhead station.

*The Secretary,
(Railway Department),
Board of Trade.*

I have, &c.,
F. H. RICH,
Colonel R.E.

Printed copies of the above report were sent to the Company on the 15th November.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., 31st October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 24th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 20th ultimo at Springs Branch junction, near Wigan, on the London and North-Western Railway.

In this case, the 12.5 a.m. up passenger train (consisting of seven carriages and two break-vans), from Carlisle for London came into collision with the 1.35 a.m. up train, consisting of 16 empty coal waggons and a break-van, from Preston for Springs Branch.

Three passengers have complained of slight injury. The fireman of the empty train was knocked off his engine and hurt.

The engine and van of the passenger train were slightly damaged, the engine being thrown off the rails, and also one pair of wheels of the van next it. The break-van and five waggons of the empty coal train were badly damaged.

Description.

At Springs Branch junction the lines to Liverpool and Manchester unite with the main line. There are two signal-cabins, No. 1 near the junction of these lines, and No. 2, 231 yards further north, near the junction of two goods lines with the main lines, the up home-signal of No. 2 cabin, situated 90 yards north of it, being slotted by the up junction home-signals of No. 1 cabin. The up distant-signal is 680 yards from the up home-signal. About three-quarters of a mile north of No. 2 cabin is the Canal cabin, at the northern junction of the goods lines with the main lines. The line between the two cabins is nearly level and straight. The traffic is worked on the absolute block system. The collision took place about 160 yards south or inside the up home-signals, and 70 yards south of No. 2 cabin, at 3.5 or 3.6. a.m.

Evidence.

1. *John Butler*, driver 25 years.—I started from Preston at 1.35 a.m., right time, with a train of 16 empty coal waggons for Springs Branch. We were stopped at Wigan north box about six minutes, took water at the south end of the station, and proceeded on along the main line to No. 2 box home-signals at Springs Branch, the distant and home signals being both at danger, the Canal box signals having been off for the main line. We more generally go along the loop line than the main line if only a few minutes in front of the passenger train. On approaching the home-signal at No. 2 box I gave a whistle for the main line signal but it was not taken off until I had been standing right under it for about 10 minutes, when it was lowered. After standing about five minutes I shouted, "Are we to go?" and got no reply. There was another engine at the time shunting on the Manchester branch at the junction. I also whistled after shouting. On the signal being lowered I drew ahead until the tail of my train was clear of the points by which I was to back on to the branch. I did not notice the signalman as I passed the cabin. On coming to a stand I said, "Up the branch," and after standing about three minutes the passenger train pitched into us. I fancied I heard it coming, but looking back I saw nothing as the two tail lights dazzled me. The blow knocked me down among the coals and shook me a bit; my fireman was knocked off the framing, he was standing in the 6-foot side looking for a signal from No. 2 cabin, and he saw nothing of the passenger train. I heard no break whistle from the passenger train. We were knocked forward about 50 yards. My engine was tender first, in backward gear, the

break was off. The guard gave me no signal to go ahead after standing at No. 2 cabin.

2. *William Parker*, fireman five years.—I agree generally with the driver, Butler's, evidence, except that I did not hear the driver shout while standing at the home-signals, and also I do not think we stood for more than half a minute after coming to a stand over the points. I saw the signalman as we passed the cabin, and I think he saw us. I was knocked across the 6-foot space into the 4-foot space of the down main line. I was hurt, and off duty for a week. When I recovered I think the fourth waggon from the engine was opposite me.

3. *John Rushton*, breaksman about five years.—I started from Preston punctually at 1.35 a.m. with a train of 16 empty waggons and a break-van for Springs Branch. We were five minutes late when we arrived at No. 2 cabin at Springs Branch, at 2.45 a.m. We stood at the home-signal about 12 minutes, I had remained in the van all this time, and was on the point of getting out to know why we were detained, when I saw the main line signal drop. I did not happen to look back at the distant-signal, which had been on when I passed it. My driver at once drew ahead, and stopped as soon as the van was clear of the points for backing on to the branch. On passing No. 2 cabin I looked in, but did not see anyone, and I also shouted, "Up branch." The junction home-signal was off as well as No. 2 cabin signal, and these signals both remained off. After we had been standing a minute or two I got out of the van to go to No. 2

cabin, when I saw the train coming and turned back to shout to my driver to go ahead. My break was off. I had no time to signal to the passenger driver. The home-signals were still off when I turned back to my driver. I was in the 6-foot space between the up loop and up main lines, about two or three waggons from the van when the collision occurred. I heard the break whistle a short time before the collision. My van had on three tail lights, all burning well, but they were all knocked out. Five waggons were knocked off the rails and damaged. The van had been completely turned round and capsized on to its side. I was not injured. I did not converse with No. 2 signalman as to the cause of the collision.

4. *James Jackson*, driver 19 years.—I joined the up passenger train at Preston to take it to Crewe. I was driving an engine having 4-coupled 6 $\frac{1}{2}$ ft. wheels and tender. There were the ordinary breaks on the tender, and a patent break applying to some of the front vehicles. We were stopped at Coppull Hall siding by signal. I had tried the break cord at Preston before starting and found it all right, and I tried it again coming into Wigan. We left Wigan at 3.2, two minutes late, after leaving which the signals were all right up to Springs Branch. Some distance (about 200 yards) from the Springs Branch home-signals, I saw the tail lights of a train ahead, they were burning well. I at first thought the train was in the loop line, but about the Cemetery bridge I saw that it was on the main line. My speed was then about 30 to 35 miles an hour. I at once shut off steam, and my mate pulled the break cord, I reversed the engine and had time to get steam against it, and I believe my fireman got his tender break on. I gave the break whistle on passing the home-signal. I struck the coal train at a speed of about 15 miles an hour. We neither of us jumped off. I was not much hurt and have not had to leave my duty. I think the break pulled us up well. The engine first turned to the right and then to the left and stopped in from 10 to 20 yards after striking. The collision occurred at 3.6. I saw a goods train in the loop before seeing the lights of the train I ran into.

5. *William Coonan*, fireman seven years.—I joined the train at Preston. As we approached Springs Branch the signals were off. About 400 or 500 yards from the van lights my driver said "Hold on." I at once pulled the patent break cord, and then put on my own break and had it got nearly on when we were close upon the van, when I held on to the injector wheel on the clack box. I was not knocked down or hurt. I cannot say what the driver did, except that he gave the break whistle while I was putting on my break. We were very near the Cemetery bridge when the driver said "Hold on," at which time the speed was between 25 and 30 miles an hour. This was reduced to perhaps 20 miles an hour when we struck. The breaks appeared to act well. The home-signal was still off when we passed it. The junction signal remained off till immediately after the collision, when I saw it put to danger.

6. *John Brown*, guard 15 years in the Caledonian Company's service.—I started in charge of the 9.10 p.m. train from Glasgow, and we left Wigan two minutes late, when the train consisted of van, composite, two third-class, sleeping saloon, three composites, and a van, nine vehicles in all. I was in the front van, which was connected with the patent break, with the five vehicles behind it except the saloon, under which the break chain passed. I had tried the break at Coatbridge, at Carstairs, a Greenock carriage having been attached at Coatbridge and at Oxenholme (it being a difficult place to stop at), and it was then in good working order. The signals were off at the Canal box, and I then was occupied in arranging the Warrington letters, when I heard the alarm whistle from the driver a very few seconds before striking. I was close to the break handle, and got on my break partially before the collision, the patent break having

been applied by the driver just after I had commenced to put my own on. I felt no effect from its application. The speed may have been 25 miles an hour. I felt the blow severely, it threw me down, and was slightly injured, but have not had to leave my duty. The front wheels of my van were off the rails and no other wheels. The time of the accident was 3.5 $\frac{1}{2}$, which I marked, about half a minute after the collision.

7. *Thomas Thomson*, guard 11 years.—I joined the 9.10 p.m. from Glasgow at Carstairs and from Wigan, I was riding in the rear van, which was attached with the patent break to the two composites in front of it. I saw the Springs Branch signals clear on rounding the curve, but saw nothing of the tail lights of the empty train, as on seeing the signals clear I was arranging my newspapers for the south. I heard no break whistle and knew nothing of what was ahead, till I was knocked down in my van, having felt no previous slackening of speed. I was not hurt. I made the time of the collision 3.6. There was no damage done to my part of the train. I had last tried my patent break at Penrith, when it was acting properly.

8. *Jonathan Underwood*, signalman 18 years, all the time at Wigan junction.—I came on duty at 8 p.m. to remain till 6 a.m. I work with station yard rules between Canal box and North box, Wigan. The empty coal train passed my cabin at about 2.35 a.m. I rang the train on as a main line train as it was a good 25 minutes in front of the passenger train. I got the usual acknowledgment, one beat, after the train had passed the Canal box, where I had seen the signal dropped for the main line. The next up train that passed was a quick mineral train for Manchester, about ten minutes before the passenger train, and I consequently rang it forward, and it was turned, into the loop. I got "line clear" for this train. The next up train was the express, which passed at 3.2 or 3. I got clear for it from the Canal box and I saw that the main line signals were off for it. I did not hear the collision occur. My cabin is about 360 yards from the Canal cabin. The needle worked by No. 2 Springs Branch to the Canal box repeats in my cabin, and I noticed it was pointed over to train on line after the passing of the empty coal train, and it was not vertical till just before the express left Wigan.

9. *Benjamin Brown*, signalman 4 $\frac{1}{2}$ years, 3 $\frac{1}{2}$ years at Canal cabin.—I work station yard rules to Wigan junction, and absolute block for passenger trains to No. 2 Springs Branch. I came on duty at 10 p.m. to remain till 6. The empty train was rung on to me at 2.31 as a main line train, and it passed at 2.41. I took my signals off for it. I signalled it on to No. 2 as an ordinary goods, with 3 pause 1, and got an acknowledgment of the same signal at once, and I got "line clear" at 2.57, one beat, which I acknowledged. I took no notice of the coal train after it had passed, but the night was clear enough for me to have seen it standing at No. 2 had I looked. I did not observe whether the signals were taken off for the empty train. I knew it was going up Springs Branch. At 2.52 I got the train on line signal from the junction for the up passenger train, having at 2.47 received the signal for the loop line for the Manchester express goods, which passed into the loop in the usual course. After this train for which I got no acknowledgment from No. 2 cabin had gone on, I acknowledged the signal for the passenger train, but did not lower my signals till after receiving line clear for the empty coal train at 2.57, the train passing at 3.1. I gave the "Be ready" for the passenger train at 2.57 or 2.58, and got the signal acknowledged, and I gave the train in at 3.1, when No. 2 pegged the needle over to "train on line." I noticed no delay in getting the signals acknowledged by No. 2 on receiving the second signal for the passenger train from Wigan junction, announcing that the train was actually leaving the station at 2.57. I gave the attention signal one stroke on the bell to No. 2 cabin, and was replied to

at once by one stroke and by the unpegging of the needle, which then hung vertical, and I gave the passenger train in at 3.1. I did not look towards No. 2 cabin after the train had passed, except to notice that the distant-signal was off. The last train on the down line had passed at 2.27. I did not hear the collision occur, and was not aware that it had done so till I inquired by speaking instrument at about 3.30, having failed to get signals acknowledged.

10. *Richard Mason*, signalman eight years ; all the time at No. 2 cabin, Springs Branch, where I came on duty at 10 p.m. to remain till 6 a.m.—I have no recollection of the empty coal train being signalled on to me from the canal box, the last train before the passenger train being an empty carriage train, which passed at 2.24. I omitted to book the Heaton Lodge goods train, for which I gave line clear to Canal box at 2.24. I got the "Be ready" for the passenger train at 3.4. at which time my needle was standing vertical. I had unpegged it at 2.40, after I had crossed an empty coal train from the down line to Springs Branch after the empty passenger train had passed. Between 2.40 and 3.4 I had received no signal from Canal Branch, except a signal for the Manchester goods upon the loop at about 2.52. On receiving the "Be ready" for the passenger train at 3.4, I signalled it on to No. 1, received "line clear" from No. 1, and gave "line clear" to Canal box, and on the train entering the section I pegged the needle over and the train arrived at 3.8. I took my signals off for it on receiving "clear" from No. 1 box. I cannot see the distant-signal very well, but I saw that the top home-signal light was off. I then booked the

passenger train. There was an engine shunting at this time close to the cabin and this prevented my hearing the noise of the empty coal train passing the cabin. I then went to the window to watch for the express and then saw the side van light of the empty train passing my cabin, and on finding it was on the main line I at once put both up signals to danger. The passenger train was then just by the signals and the driver whistled for the breaks. I heard the driver of the empty coal train shout as he passed the cabin, "Up to branch," but I at first thought he was on the loop. It was I who threw up the home-signal, not No. 1 signalman. The collision occurred at 3.8. I sometimes register the loop trains, but only in case I think there is likely to be some inquiry about delay. I have had no orders not to enter all trains.

11. *Richard Clarkson*, signalman seven years, 2½ years in No. 1 cabin, Springs Branch.—After the empty carriage train had passed, at about 2.35, no signal either for the up or down line passed between me and Mason till he gave me three bells for the express, at about 3.3. He gave this signal in the usual way. I gave him back one, pulled over the home and distant levers, the former taking off the home-signal at No. 2 cabin as well as moving a disc in the cabin. I saw nothing of the empty coal train till it came between the two boxes, when I at once put back my signals to danger, a few seconds after which the collision occurred. I had received no signal of this train for the branch from Mason. I heard the break whistle from the passenger train just as I put back my signals. This was just before the driver reached the home-signal. The collision occurred at 3.5.

Conclusion.

This collision between an up express passenger train and a train of empty coal waggons is to be attributed to neglect of duty on the part of the signalman (Mason), in No. 2 cabin at Springs Branch junction. The weight of the evidence goes to prove that this man, although he himself denies having done so, must have accepted the block signals for the empty coal train (which was proceeding to Springs Branch), at 2.41 a.m., and must then have forgotten that he had this train "on line," as he did not take off his signals for it, but allowed it to stand for some 15 minutes at the home-signal post, only 90 yards north of his cabin. At 2.57, on the signalman in the Canal cabin giving the "attention" signal for the coming express train, "line clear" was at once given back by Mason for the empty coal train, the express train taken "on line," and the home and distant signals taken off for it. The driver of the empty coal train, seeing the home-signal drop, concluded it was for him to proceed, and accordingly drew forward past No. 2 cabin until the tail of his train was clear of the points through which he had to set back, and while waiting for a signal to do so was run into by the express train, which had not been seen or heard by either the driver or the guard of the empty train in time for anything to be done either to warn the express train or to move the empty train ahead.

The driver of the express train, finding the Springs Branch signals off for him, was proceeding at a speed of from 30 to 35 miles an hour, when about 200 yards north of No. 2 cabin home-signal, he first noticed the tail light of the empty coal train, but did not realize until he had proceeded about 100 yards further that the train was on the main line. His distance from the van was then about 260 yards, and although every means were then at once used to stop, including the application of the patent breaks applying to four of the front vehicles, and (partially) of the front van breaks, the speed was reduced only to 15 or 20 miles when the collision occurred. The guard at the rear of the train, who could have applied patent breaks to two carriages in front of his van, had not heard the break whistle, and having seen the Springs Branch signals clear, was arranging parcels, and was taken unawares by the collision, having observed no previous slackening of speed.

It is singular that the driver of the express train should not have realized sooner than he appears to have done the fact that the empty coal train was standing upon the main line, which is perfectly straight for a considerable distance north (three-quarters of a mile) of No. 2 cabin ; the fact of finding the signals off no doubt tended to prevent his looking so carefully ahead as he might otherwise have done. Notwith-

standing this, had he possessed control of a continuous break applying to the engine and tender as well as to all the vehicles composing the train instead of to only four out of nine of those vehicles, the force of the collision might have been very much reduced.

The only reasonable explanation of Signaller Mason's conduct is that he must have fallen asleep after having accepted the signal for the empty coal train, and on being aroused by the attention bell for the express train have forgotten all about the empty train until he saw it passing his cabin after having taken the signals off for the express train. He had come on duty only at 10 p.m. for a spell of eight hours, so that long hours of duty could offer no reason for his negligence. His train register also had been imperfectly kept on the night in question, for as regards up trains he had made entries of only 11 trains, &c., instead of 17, which had been signalled on to him from the Canal cabin, and of these 11 he had made a mistake in the entry of one.

*The Secretary,
(Railway Department),
Board of Trade.*

I have, &c.,
C. S. HUTCHINSON,
Major-General R.E.

Printed copies of the above report were sent to the Company on the 22nd November.

LONDON AND NORTH-WESTERN RAILWAY.

SIR,
Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 8th October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 30th ultimo, the result of my inquiry into the causes of a collision which occurred on the 25th ultimo, at Rugby station, on the London and North-western Railway, between a portion of a passenger train and an engine.

In this case, the Birmingham portion of the 3.10 p.m. down passenger train from London, consisting of one van, one guard's break-van, and two carriages, had been shunted into the bay at the down side of the down platform, until the departure of the Trent Valley portion of the 5.15 p.m. down express, when the Birmingham engine was attached to it, and it was drawn out in order to be set back and attached to the Birmingham portion of the express, which was standing on the down platform line. Owing to the points for this line not having been set right, these carriages were pushed back on to the main down line and came into collision with an engine which was standing opposite to the down end of the down platform, about 57 yards beyond the points, and about 100 yards from the point from which the tail end of these carriages had started back.

Four passengers in all have complained of injury.

The damage to rolling stock was confined to the breaking of the coupling between the tender of the engine and the front van, and the slight bending of the buffer rods of the carriages.

There was no damage to the permanent way.

The collision occurred at 7.32 p.m.

Description.

There are four lines of rails through Rugby station, a through up and down line and a platform loop on each side.

The trailing points of the down loop, or platform line, are about 57 yards north of the down end of the platform, and about 27 yards further north are the trailing points of a line from a bay known as the Leamington bay.

These connections are worked from the Midland junction signal-box, which contains 75 working levers, and controls the whole of the signals at the north end of the station.

The nearest point of this signal-box is about 73 yards north of the end of the platform, and 16 yards north of the connection of the platform loop with the down main line.

The only signal to which it is necessary to refer is the starting-signal from the Leamington bay, which is about half-way between the signal-box and the platform.

Evidence.

John Morris, signalman seven years, states :—I have been for about three months in charge of Midland junction signal-box at Rugby, but have been in Rugby yard ever since I was appointed. On the 25th September I came on duty at 6 p.m. I was taking part of another man's duty, so that I was coming on for 12 hours. My proper shift is an eight hour shift. The Birmingham portion of the 3.10 p.m. down local train from London had been placed in the bay until the departure of the Trent portion of the 5.15 p.m. down express. As soon as the Trent portion had gone I took the signal off and set the points for the carriages to come out of the dock, but instead of their coming the Leamington engine, which had on this occasion been used for shunting there, came out alone. I let it run on down the main line a little way, and then let a goods engine, which at first I thought was the Birmingham engine, come forward from the down main line, where it was standing, and then let the Birmingham engine come, and set it back on to the coaches in the bay. I then set the points back again for the goods engine and the Leamington engine to run back to stand on the down main line. When they had got back clear I let the Birmingham engine and coaches come out of the bay, and, having shut the bay points, I gave a signal for them to set back as I thought on to the platform line to attach to the Birmingham portion of the express. In the hurry, however, I forgot to pull over No. 28 points for the platform line, and the carriages, therefore, took the main line, and came into collision with the Leamington engine which was standing opposite to the water column. I did not take notice of the speed the carriages were running, and as soon as I had noticed they were going wrong the collision occurred. It was rather dark at the time, about 7.32 p.m. There are 75 working levers in my signal-box, and I have an assistant except on Sundays.

John Lloyd, passenger driver 15 years, states :—On the 25th September I was driver of the 7.28 p.m. down passenger train to Birmingham from Rugby. After the Trent portion of the 5.15 p.m. down express had left Rugby I was sent back into the Leamington bay to fetch out a van, a guard's break-van, and two passenger carriages, which had been part of the 3.10 p.m. down slow train from London. I had to bring

them out, and set them back to attach to the Birmingham portion of the down express which was standing on the down platform line, about two-thirds of the way down the platform. As soon as the signal was lowered for me I came out on to the down main line, and as soon as the carriages were clear of the points I received a hand-signal from the signalman and from the shunter in charge to set back. The shunter was standing on the step of the last carriage. I set back at the usual speed, cautiously, about six miles an hour, and did not know anything was wrong until I heard the driver of the Leamington engine shouting to me. I had just time to reverse, but had only got steam on when we struck the engine. It was not at all a violent collision. The coupling between the tender and the front van was snapped by the rebound, but there was no other damage to the engine and tender.

David Lilley, porter five years, all of which at Rugby, states :—On the 25th September it was my duty to shunt the Birmingham portion of the 3.10 p.m. down train into the Leamington bay, and afterwards to bring it out again and attach it to the Birmingham portion of the 5.15 p.m. down express. As soon as the Trent portion of this train had gone, on the signal being lowered, we came out on to the main line. The points of the bay were put back and the signalman signalled to set back. I repeated the signal to the driver. At that time I was on the step of the last carriage and about 38 yards from the points of the platform line. It was dark and I could not see them, but thought that as the signalman had signalled to me he must have set them right. I did not find out they were wrong until I was over them and about 10 or 12 yards from the Leamington engine, which was standing on the down main line. I jumped off and turned a red light to my driver, but before he could do anything we had struck the engine rather sharply. No vehicles were thrown off the road, but the buffer rods of the carriages were slightly bent. There were a few passengers in the carriages. None complained to me, and I did not see that any were hurt. I have done this same shunting in my turn for the last five years, and I never remember any other case of accident. The driver was not setting back any faster than usual.

Conclusion.

This slight collision was due to a mistake on the part of the signalman in the Midland junction signal-box at the north end of Rugby station, who gave a hand-signal for the Birmingham portion of the 3.10 p.m. down train from London to set back, without having pulled over the points for the down platform line.

He is a man bearing an excellent character, and frankly admitted that he alone was to blame for the accident.

The Company have since the accident quite rightly given orders that the shunting-porter in charge of this operation shall in future go back to see that the points are right before he allows the train to be set back, but it would be well if a shunting signal interlocked with the points were provided, both at this station and wherever this shunting of passenger trains is a matter of very frequent and regular occurrence.

The mistakes incident to the use of hand-signalling would then be avoided, and the signal for the train to set back could not be given unless the points were right for it.

The Secretary,
(*Railway Department,*)
Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major B.E.

Printed copies of the above report were sent to the Company on the 17th October.

LONDON AND NORTH-WESTERN AND GREAT WESTERN RAILWAYS.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, Whitehall, London, S.W., 25th July 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 9th instant, the result of my inquiry into the circumstances which attended the very serious accident that occurred on the 8th instant, near the junction of the Holyhead and Birkenhead lines, at the western side of Chester central station, on the joint line of the London and North-Western and Great Western Railway Companies, from Chester to Birkenhead.

Fourteen passengers are stated to have been injured on this occasion, one of the number, travelling with a pass, being in the company's service, and of that number two have subsequently died, and some of the others are seriously hurt.

Three carriages got off the rails, and one of these carriages was thrown over on to its side, and a good deal damaged, the others were very slightly damaged, and the near off buffer rod of a carriage next in front of the three that left the rails was also broken.

Some slight damage was also done to the permanent way.

The Great Western 10 a.m. down passenger train from Paddington, due at Chester at 4.55 p.m., is continued as a joint line train of the London and North-Western and Great Western Railway Companies from Chester to Birkenhead at 5.10 p.m.

On its arrival from London it is run into what is called the Birkenhead Bay, adjacent to and at the south side, and at the western end of the main line platform, that extends through the station in an easterly and westerly direction, Chester being a one-sided station, belonging to the aforesaid railway companies.

This train, on the day in question, remained alongside of the same platform until it left for Birkenhead at 5.23 p.m.

The joint lines of the London and North-Western and Great Western Railway Companies, between Chester and Birkenhead, leave the Chester and Holyhead lines of the London and North-Western Company somewhere about 140 yards west of the west end of the main line platform. The lines to Holyhead curve off to the left, and those to Birkenhead curve off to the right.

About 24 yards west from the facing-points at the junction of the down lines to Holyhead and to Birkenhead, measured along the down line to Birkenhead, there is another pair of facing-points of what is called a slip road, for connecting the down line to Birkenhead with the up line from Holyhead, so that all down trains to Birkenhead have to pass over these two pairs of facing-points, one at the junction of the Holyhead and Birkenhead down lines, and the other at the slip road connecting the down line to Birkenhead with the up line from Holyhead. Besides these two pairs of facing-points, the down train had also previously to pass over a third pair of facing-points of a cross-over road, to enable it to reach the down line to Birkenhead from the Birkenhead Bay line, alongside of the platform from which it started.

The slip road is about 25 yards in length, and about 3 feet west of the western end of the slip road there are a set of three-throw points leading from the up line from Holyhead to a siding, on which there is an engine turntable, to the main up line, and to a cross-over road.

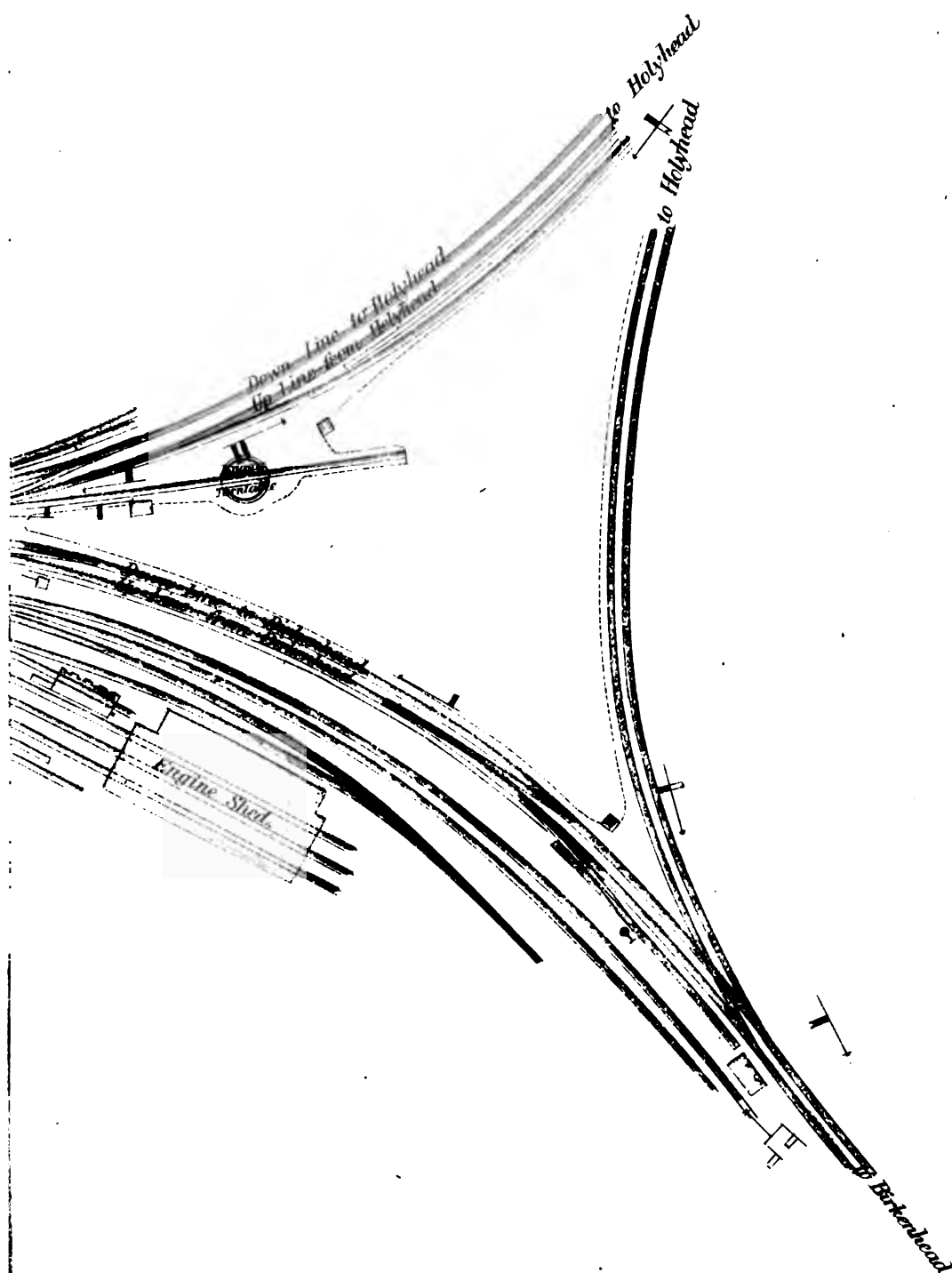
These points are trailing points for all up traffic from Holyhead and the west, but they are facing-points to all engines or vehicles passing by way of the slip road or backwards on the up Holyhead line from east to west, or towards the turntable siding.

The points and signals connected with this portion of road are worked from No. 4 signal-box, placed nearly opposite to the junction of the Holyhead and Birkenhead lines. The interlocking of the levers that move the points and signals that refer to these junctions is correctly carried out in the locking-frame in the signal-box; but on the ground there are no locking bars placed in front nor at the side of either of the three pairs of facing-points to which I have referred, and which had to be passed over by the 5.10 p.m. down passenger train when leaving Chester for Birkenhead, and each set of facing-points was only connected together by single, instead of double, connecting rods.

As the result of such interlocking, I should state that when the down junction signal moved by lever No. 11 was taken off and set at "all-right" for the 5.10 p.m.

To accompany Colonel Yolland's
Report dated the 25th July 1878.

RAILWAY.

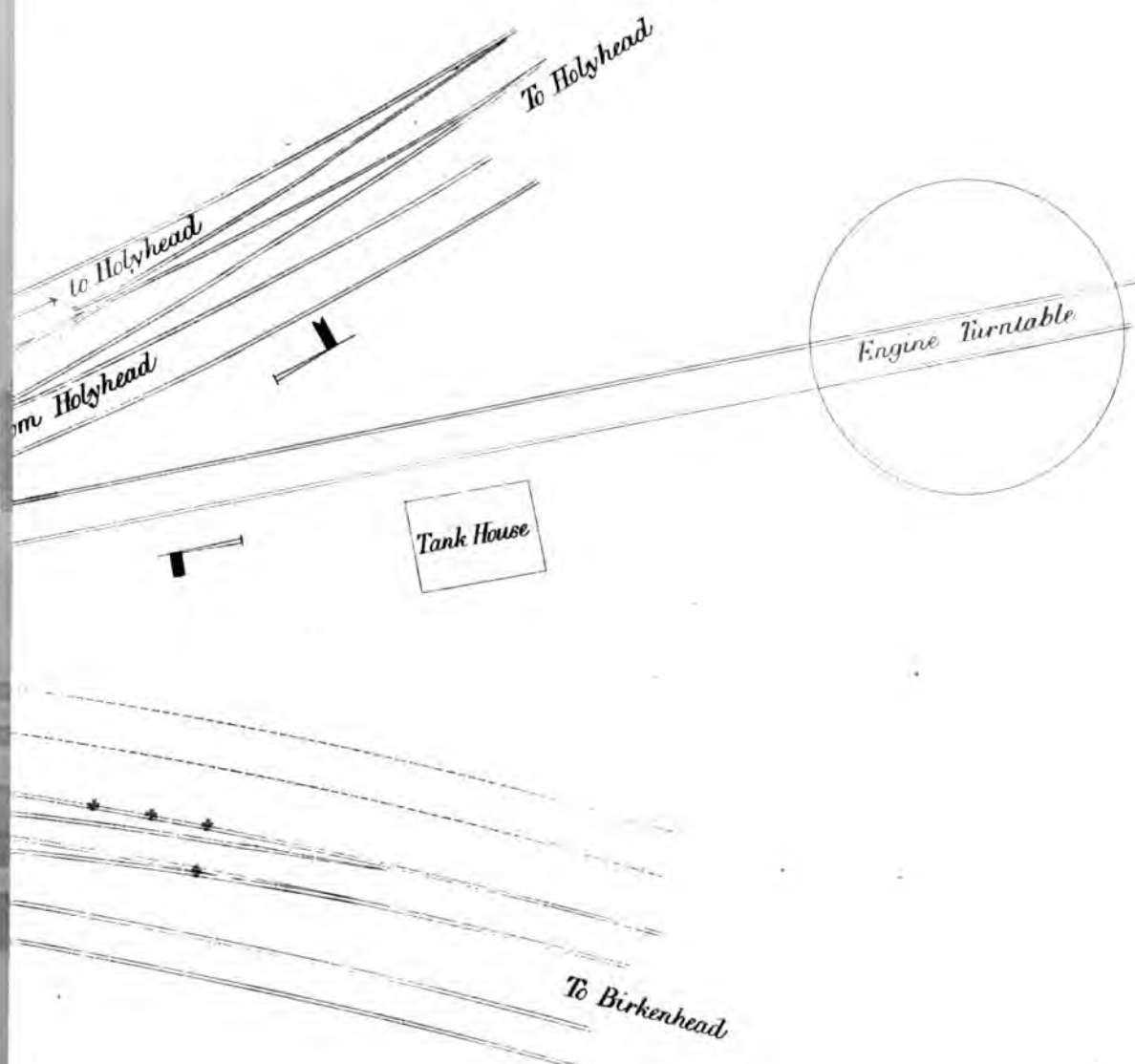


NT

to
the Hole

To accompany Colonel Yolland's
Report dated the 25th July 1878.

NT RAILWAY.



train to leave for Birkenhead, neither the facing-points at the junction of the Holyhead and Birkenhead lines moved by lever No. 35, nor those at the slip road moved by lever No. 14, could be shifted, while the down-signal remained set at "all-right;" but immediately No. 11 lever was shifted in the signal-box to the other notch, and the down-signal was thus restored to its normal position of "danger," then both of these facing-points could be shifted, although a train might at the time be running over them.

The evidence in this case is as follows:—It was mostly taken down by the officers of the two railway companies on the day after the accident happened, and placed at my disposal, and as I read it over to each man in succession, I added to it such farther information bearing upon the subject and probable causes of the accident as I could obtain, and this additional evidence is printed in italics.

Thomas Roberts, inspector at Chester station, states: I started the 5.10 p.m. train, Chester to Birkenhead, last night. It consisted of six carriages and two break-vans, all Great Western stock, marshalled as follows: break-van, one second, one first, one composite, three thirds, and break-van. It left the platform at 5.24 p.m. I noticed that the disc was off for the train to start to Birkenhead and also saw the main line signal at No. 4 box off for Birkenhead. About a minute and half after starting I heard whistling, and turned round and saw a carriage on the bank. I did not notice the main line signals after the accident, and cannot say whether they were on or off.

Samuel Mauley states: I am a carriage examiner in the employ of the Great Western Company at Chester. I examined the 5.10 p.m. train, Chester to Birkenhead, yesterday, before starting and found everything all right. *I did not look to the state of the road after the accident had occurred, and I have not examined the state of the carriages that got off the rails since the accident happened.*

Edward Astbury states: I am a foreman carriage examiner in the employ of the Great Western Railway Company, at Chester. I examined the carriages of the 5.10 p.m. train, Chester to Birkenhead, which had been off the road, after the accident yesterday. The numbers of the coaches were 609, 649, and 1,157, all thirds. I gauged the wheels and found them all right, and the flanges, axle guards, and springs all in good order. No. 649 was considerably damaged on its side and a buffer on that, and composite No. 41, in front of No. 609, were broken. The drawbars of the three carriages off the road were bent. *The three carriages that were off the road were all coupled together. The coupling with the carriage in front of No. 609 was not broken, but it was uncoupled when I arrived there. I cannot say whether the wheels of 609 carriage were all off the rails, and the last of the three carriages were not coupled to the van when I got there.*

John Brookes states: I am an engine-driver in the employ of the London and North-Western Railway Company, 28 years as driver and 33 years in the service. I was working the 5.10 p.m. passenger train, Chester to Birkenhead, yesterday. I got a signal from the guard to start at 5.23 p.m., and the disc in the Birkenhead Bay and the junction signals were at "all-right" for us to proceed. When we were passing opposite the engine turntable I heard an engine giving the "danger whistle." I looked round, shut off the steam, the fireman applied the break, and we brought the train to a stand almost directly. I then jumped off my engine, ran back, and found one carriage lying on its side and two others off the rails but on their wheels. I did not notice the position of the signals or the facing-points after the accident, as I did not go back sufficiently far to see them, but devoted my attention to the passengers who were injured. The 4.55 p.m. passenger train from Birkenhead, due into Chester at 5.30 p.m., was coming in, and I ran to the end of the ticket platform and signalled to the driver to stop, which he did. The

speed passing the junction would be about 6 miles an hour. The junction-signal was down when I passed it. I noticed nothing unusual from the time of leaving the station until I heard the whistling of the engine on the turntable. *I did not notice how the down junction-signal for the Birkenhead line was standing as I walked back after I had stopped the train, neither did I notice how the signal for a train to come out from the turntable was standing.*

William Brassington states: I am a guard in the employ of the Great Western Railway Company 34 years. I was in charge of the 5.10 p.m. passenger train, Chester to Birkenhead, yesterday. My train left at 5.23 p.m., and consisted of nine vehicles, including the engine, made up as follows, viz.: London and North-Western engine with tender, No. 763, driver Brookes; break van, No. 462; second-class carriage, No. 344; first-class, No. 533; composite, 41; third-classes, 609, 649, and 1,157; and break-van, 465, marshalled in the order given. I was in the front van, next the engine and tender. The main-signal at No. 4 box was dropped before we started from the platform. I did not notice the starting-signal. When about 50 or 60 yards beyond the signal-box, I felt an oscillation of my van and attempted to apply my break, but before I could do so the train had come to a stand. We were travelling at about the rate of 5 or 6 miles an hour when we passed the junction. When the train stopped I looked back, and saw some of the rear vehicles were off the line. I then got out of my van and rendered what assistance I could. I did not notice the position of the signals at the junction after I left the station. *I did not see the position of the main-signal as I went back, nor the points, nor the signal to come out from the turntable.*

George Pink states: I am a guard in the employ of the Great Western Railway Company. I was assistant guard of the 5.10 p.m. passenger train, Chester to Birkenhead, yesterday, and was riding in the rear van. We left Chester at 5.24 p.m. *I came with the train from Paddington and it left Chester as it arrived from Paddington.* When we had passed Brook Street Bridge about 30 yards I felt a "jerk" of the train, and at once put on my van break. I then put my head out of the window to ascertain what was the matter, but in consequence of a quantity of stones and pieces of wood flying about in the air, I had to withdraw it. At this time I heard several engine whistles, and our train came to a stand. I got out of my van and then noticed that the three third-class carriages in front of it were off the road. The middle one was lying on its side, and the other two were off the road but on their wheels, whilst the wheels of my van had taken the Holyhead road. *I am not quite certain as to which line of rails it was on.* I did not notice the position of the signals either before the train started or after I came to a stand, neither can I speak as to the position of the points.

William Littler states: I am a foreman platelayer at Chester station, and have been so for 20 years. I

examined the road where the accident to the 5.10 p.m. passenger train, Chester to Birkenhead occurred yesterday at 4.30 p.m., when the points fitted well, and the road was in good order. I also examined the road after the accident and found about a dozen chairs were broken, at about the place where the carriage was turned over on its side. A number of point rods on the Birkenhead side of the junction were also badly broken, but no point rods were broken in connection with the facing-points for a train going to Birkenhead. I was not present at the time of the accident, but was informed of it and went to the spot shortly afterwards. The first indication I saw of anything having been off the road was at the check-rail for the road going to the turntable. *The van at the tail of the train had not been moved when I got to the spot, it was standing on the rails leading to the turntable clear of the points, and these points were set right for going on to, or for leaving the turntable. I did not notice the dwarf signal which is used to control the coming out from the engine turntable. The slip points for passing from the down Birkenhead line towards the up Holyhead line, and to the points leading to the engine turntable were standing open when I saw them for a train to pass along the down Birkenhead line. I got there about 5.25 or 5.27 p.m., immediately after the accident had happened. None of the vehicles had been moved. The van was still coupled to the carriage in front: the trailing wheels of the first carriage of the three were off the rails: the centre and leading wheels were still on the rails. I cannot say whether the three vehicles that were off the road were coupled together or not. The rear wheels of the van at the tail of the train were standing on the rails of the siding line leading to the engine turntable clear of the points. I cannot say whether it was coupled to the carriage in front or not.*

John Adams states: I am a permanent way inspector employed on the Chester and Birkenhead joint line. I passed the points where the accident to the 5.10 p.m. passenger train, Chester to Birkenhead, happened yesterday (8th), but did not notice them minutely, both the points and the road, however, appeared to me to be in proper order. I examined the road after the accident and found the following chairs broken, viz., four point chairs, two check chairs, and eight or ten middle chairs. All of these were on the Birkenhead side of the junction. A number of signal connections were also broken, but no connections for the facing-points for a train going to Birkenhead were broken. I did not get to the scene of the accident until after 8 p.m., and then all the vehicles had been removed. I noticed a bruise on the right rail of the incoming line from Holyhead on the outside of the rail, a little further to the west of the mark on the check-rail, covering the crossing of the right rail of the slip road by the left rail of the down line to Birkenhead, and one heel chair, and one slide chair under the moveable switch-rail at the western end of the slip road; another chair was broken nearly opposite to these last chairs on the left rail of the down line to Birkenhead, and there were marks on the ballast showing that some wheels were off the rails opposite the marks. I have not formed an opinion as to the manner in which the accident was occasioned. If No. 14 points had been shifted while a train was passing over them, it would account for all the marks which I found on the ground.

Mr. Wilson Worsdell states: I am a locomotive foreman in the employ of the London and North-Western Company at Chester. At about 5.15 p.m. yesterday I was walking in the direction of the engine turntable to see a Denbigh driver named William Price, and on looking round I observed a train approaching, which turned out to be the 5.10 p.m. passenger train, Chester to Birkenhead: I stopped to watch it pass the junction: I saw the fifth vehicle from the engine leave the rails, at the check-rail on the turntable road, dragging two

other carriages with it. One of the vehicles I observed to turn on its side, and it was then dragged some 7 or 8 yards. The other two vehicles ran in the same direction, but remained on their wheels. I at once looked out for some one to fetch out the break-down gang, (as I saw the case was of a serious nature), and whilst waiting the arrival of the gang I rendered what assistance I could in extricating the injured passengers. I did not notice the position of any of the signals or points as my attention was taken up by the mishap. I was standing in the "Six-foot" on the Birkenhead side of the junction when the train passed.

William Price states: I am an engine-driver in the employ of the London and North-Western Company, and was in charge of engine No. 842 yesterday. I went on the turntable road at about 10 minutes to five, turned my engine, took water, and then went over the turntable road to allow a Great Western engine to turn. The Great Western engine came off the table about five minutes before the accident occurred, and went on to the up Holyhead line, and crossed to the down Holyhead line, and then went to the back line of the Holyhead ticket stage, for the purpose of propelling some empty carriages to be attached to the 5.40 p.m. train. I then started off the turntable, and came to a stand at the stop-signal. When standing there waiting for the signal to be lowered the 5.10 p.m. train to Birkenhead passed, and I saw a carriage (the second from the rear van) "lift" and run off the road. Myself and my fireman at once commenced to whistle, to warn the driver of the 5.10 p.m. train. I cannot speak as to the position of the points or signals when the carriages came off the road. I cannot tell how the points stood that led to the engine turntable. I was on the turntable line, waiting to go towards the station. I was waiting for the signal. I wanted to run as far as the junction of the up Holyhead line with the up Birkenhead line, then to have crossed to the down Birkenhead line, and to have waited there until the arrival of an up train from Birkenhead, which I was to take into the station.

Thomas Lloyd, fireman on engine 842, states: We went on the turntable at about a quarter to five, took water, turned our engine, and then drew over the turntable to allow a Great Western engine to turn. When the Great Western engine had gone we drew up to the stop-signal, and waited there for it to be lowered for us to come out. Whilst standing there I noticed the third coach from the rear van of the 5.10 p.m. passenger train, Chester to Birkenhead, mount the rails and get off the road. My mate went to one whistle and I myself went to the other, and commenced to whistle, to warn the driver of the Birkenhead train. The junction-signal was standing at "all-right;" when the train got opposite to the signal-box the signal was off. I did not see that signal put to danger. I did not notice the position of the points. I am not certain the signal stood at "all-right" for the Birkenhead train to pass at the time I saw the carriage mount and get off the rails.

Peter Jones, pointsman at No. 4 junction-box, Chester station, 23 years a pointsman and nine years in that signal-box, states: I was on duty when the 5.10 p.m. passenger train for Birkenhead left the station on the 8th inst. I set my points and signals properly for the train to run on, and it passed the box alright. I was looking at the train as it rounded the junction, and I saw one of the carriages jump off the metals, and then the others followed. I then saw one go over on its side. I at once put the main line signal up to protect the road; but I did not put that signal to danger until I saw the carriages off the rail. There was a London and North-Western tank engine standing on the turntable at the time, this engine had not whistled to come out. I am certain that I did not touch the points, or move them in any way before the Birkenhead train passed them. This I am positive of, and am prepared to take oath to. I have been

employed for 26 years on the joint station at Chester, and have been 23 years a pointsman. I have been in No. 4 box since it was opened, nine years since. I came on duty at 2.0 p.m., and was due off again at 9.0 p.m. I had no person in the box with me. From the time the Great Western engine went on to the turntable to the time of the accident, about five or six minutes would have elapsed. We cannot work the points leading to the turntable when the junction-signal is off. I noticed nothing whatever unusual in the speed

of the train passing the junction, neither did I see anything flying about until the carriages left the rails. *The points leading to the engine turntable (one of the three-throw set) were not set right to get to the engine turntable. When I saw the carriages get off the rails, and the signal was not off for anything to come out from the turntable leaving at that time. I had put the starting-signal for the 5.10 train to danger before I saw the carriages get off the rails.*

From the preceding statements and from an examination of the marks on the permanent way, which were pointed out to me as having been caused by some of the three vehicles which got off the rails and caused the accident, it would appear that an engine belonging to the London and North-Western Railway Company, with eight vehicles behind it, and belonging to the Great Western Railway Company, and constituting the 5.10 p.m. down joint line passenger train from Chester to Birkenhead left the station platform in the same condition as the carriages had arrived from London: that it passed safely over the facing-points at the junction of the Holyhead and Birkenhead lines; and the front part of the train also passed safely over the facing-points of the slip road, which are moved by lever No. 14: that the first mark of any vehicle being off the rails was found on the eastern end of a check-rail, inside the left rail of the slip road, 48 feet 2 inches west from the tongue of the facing-points of the slip road, the mark being $2\frac{3}{4}$ inches from the working face of this left rail: that the next mark was at 52 feet 9 inches from the same tongue on the outside of the right rail of the up line from Holyhead: that at 72 feet 4 inches the right chair under the right rail before reaching the heel of the points at the western end of the slip road was broken, and at 78 feet 3 inches the slide chair under the right switch rail of these points was also broken, and at 79 feet 9 inches a chair was broken under the left rail of the down line to Birkenhead, and several more chairs under the same rail were broken farther on.

At 75 feet 4 inches from the tongue, wheel marks were also found on the sleeper under the slip road between the rails, and about 18 inches from the right rail.

The three carriages which got entirely off the rails, viz., the fifth, sixth, and seventh, were found in the fork between the line of the turntable siding and the down line to Birkenhead, the fifth and seventh were standing on their wheels off the rails, and the sixth had turned over on to its side, and I understand that one of the two passengers who have since died of the injuries which they received was found lying under this carriage, the door of which had been opened. The engine is stated to have stopped on the down line to Birkenhead, about 160 yards from the facing-points of the slip road.

Thus it appears that the engine and four next vehicles travelled rightly along the down line towards Birkenhead, that the fifth, sixth, and seventh 6-wheeled carriages got off the rails on the outside of the curve either by mounting them or by being pulled off them before some of those carriages had got so much as 17 yards from the slip road facing-points, and that the last vehicle in the train does not appear to have been off the rails at all, but was found when it stopped on the siding leading to the engine turntable, and not on the down line to Birkenhead.

I have already stated that it would not be possible to shift the facing-points at the eastern end of the slip road unless the down-signal for the train to Birkenhead had previously been placed at danger after having been set at "all-right" for the train to leave Chester for Birkenhead. The signalman on duty, a man of large experience, and stated to be a man of good character, distinctly states that he did not shift the facing-points of the slip road, and that he did not replace the down junction-signal for the train to Birkenhead at "danger" until he saw the carriages get off the rails.

The officers of the two companies, at my request, were good enough to place an engine and some similar carriages at my disposal, and I caused the engine and the leading carriage to be moved over the points of the slip road, along the down line to Birkenhead, clear of the points, which are 10 feet 6 inches in length, and I then had the facing-points of the slip road shifted, so that the second carriage travelled along the slip road towards the up Holyhead line, and the three-throw points leading to the turntable siding, and I noted what took place. At 37 feet west from the facing-points, from which all the previous measurements are given, the left leading wheel of the second 6-wheeled carriage, which was moving along the slip road, had been lifted 3 or $3\frac{1}{2}$ inches above the left rail of the slip road. At 41 feet 6 inches the draw-bar of this last carriage came in contact with the rear left buffer of the carriage in front which was running on the down Birkenhead line, and if I had allowed the engine to

continue running forward a few more feet the second carriage would certainly have been pulled off the rails of the slip road. (I may mention, as bearing upon the probable causes that led to this accident, that when I tried a similar experiment elsewhere, the left wheel of the diverted carriage, has been raised as much as 18 inches above the level of the rails, before the carriage was torn or jerked off the rails.)

The distance between the trailing wheels of No. 41 carriage in the 5.10 p.m. train for Birkenhead that remained on the down line, and the leading wheel of the first carriage, No. 609, that got off the rails, is 14 feet 2 inches, while the wheel base of these 6-wheeled carriages is 19 feet.

The mark on the check-rail, as previously stated, is at 48 feet 2 inches from the facing-points, or only 6 feet 8 inches beyond where the draw-bar came in contact with the rear left buffer of the carriage in front, and here I must call attention to the fact that the rear left buffer of the carriage, No. 41, that remained on the down line to Birkenhead, was found broken off, broken in the buffer-rod, in which there was a flaw in the centre of the metal.

Hence, placing great dependence as I do on the marks found on the ground, I have arrived at the conclusion that the facing-points of the slip road, moved by No. 14 lever, were shifted while the train was passing over them, and that the shift took place after the fourth carriage in the train, No. 41, had passed over them, but before the fifth carriage, No. 609, had reached them; the effect of this shifting of the facing-points being that the four last carriages in the train were diverted and turned to pass along the slip road towards the up Holyhead line, and towards the points leading into the turntable siding, from whence a Great Western engine had only recently come out; that each of the three carriages were in succession dragged off the rails of the slip road, and that the last carriage which stopped on the rails of the turntable siding would also have been dragged off the rails, if the engine had not been stopped or a coupling had not given way.

I believe all railway companies now forbid their signalmen to replace the governing signal at "danger" until they see that the last vehicle of a running train has passed over the facing-points; but I am sorry to say that this regulation is generally disobeyed, and the signal is frequently replaced at danger, before one half of a train has got clear of the points.

This accident appears to me to be in all respects similar to that which occurred on the London and North-Western Railway at Wigan some years since, except as regards the speed at which the trains were travelling, and I was therefore certainly very much astonished to find that the London and North-Western Railway Company, as one of the joint owners of the Chester station, had, after the very serious accident at Wigan had occurred, and the serious expense to which it was thereby subjected, allowed so many pairs of facing-points to remain unprotected by locking bars in the Chester station yard for such a number of years.

I cannot learn that this part of the Chester station yard was in its present state ever subjected to the inspection of an officer of the Board of Trade.

Some alterations farther west in a new fork line connecting the Holyhead and Birkenhead lines were made in 1874 and submitted for inspection. In this case all the facing-points were properly protected by facing-point locks and locking bars, and if the slip road points had been similarly protected I am of opinion that this accident would not have occurred.

I have, &c.,

W. YOLLAND, *Colonel*.

The Secretary,
(Railway Department,)
Board of Trade.

Printed copies of the above report were sent to the Great Western and the London and North-Western Railway Companies on the 14th August.

LONDON AND NORTH-WESTERN AND GREAT WESTERN (SHREWSBURY AND HEREFORD) JOINT RAILWAY.

SIR,
Railway Department, Board of Trade,
13, Downing Street, London, S.W., 26th October 1878.

I HAVE the honor to report, for the information of the Board of Trade, in compliance with the instructions contained in the order of the 29th July, the result of my inquiry

into the circumstances connected with the accident which occurred on the 20th July, near Leebotwood station, on the Shrewsbury and Hereford Joint Railway.

In this case, as a Joint Railway Company's up ballast train from Shelwick junction to Shrewsbury, consisting of tender, engine, 10 empty ballast waggons, and a break-van, in which latter eight permanent-way men were riding, was running round a gentle curve about half a mile north of Leebotwood station, the last waggon left the rails, followed by the break-van, both vehicles falling over on their left sides.

All the men in the van were injured, one of them having his thigh, and another his arm and collar bone broken.

The waggon, van, and permanent way were damaged.

This report has been delayed owing to the man (Speake) in charge of the break-van, whose thigh was broken, having been too ill to be examined when I first made my inquiry.

Evidence.

1. *Thomas Hughes*, driver in the Great Western Company's service six years.—I left Shelwick junction on the day in question with a six-wheeled coupled engine, running tender first, and had last stopped before the accident at Craven Arms, which we left with a load of 11 empty waggons and a van. On the engine with me were my fireman, and from Church Stretton (where we had slacked but not stopped) the guard. He came on the engine to give information where next to stop, viz. Dorrington. At Leebotwood we got clear signals, and ran through the station at a speed of about 20 miles an hour; and some 40 or 50 yards from where the waggon stopped I felt a jerk. I turned round and saw the last waggon jumping up and down. Steam had been shut off about two miles previously, and before I had time to reverse I saw the van turn over on its left side, but not the waggon. We ran about 10 or 12 yards after this happened, and then came to a stand with the train all coupled together. I took no means to ascertain why the waggon had left the rails. The down line was not fouled. The guard went back to Leebotwood to block the up road. We then took the injured men to Shrewsbury on a waggon attached to the engine. The accident occurred at 4.25 p.m. I had felt nothing wrong with the road about the spot. There were no repairs going on to that part of the road.

2. *Henry Marston*, 10 months guard of the ballast train, and eight years in the Joint Committee's service, aged 20.—I started from Shelwick junction with a ballast train for Shrewsbury, and from Craven Arms the train consisted of 11 empty waggons and a van. At Church Stretton, where the train slacked, some platelayers left the van, leaving eight still in it; and I went to the engine to tell the driver to put some of the men off at Dorrington, and rode on it, though this was against orders. I left Speake, who acted as flagman, in charge. I first felt something wrong by the under-bridge, 50 or 60 yards from where the waggon is now lying: it was like a jerk. I looked back, and saw the waggon jumping, and then the van fall over on its left side. The engine soon stopped after running 20 or 30 yards. The waggon was lying on its left side, but had not separated from the waggon in front of it. Some of the men were outside of the van, and some inside. I got my flag, and went back to Leebotwood to protect my train. Our speed at the accident was about 17 or 18 miles an hour. The driver whistled after seeing the waggon off, and I saw Speake applying the break when I looked back.

3. *Joseph Allen*, platelayer.—I rode in the van of the ballast train from Craven Arms. I did not see Marston in the van after I joined the train. We came to a stand at Church Stretton to let some men off, and

between Church Stretton and Leebotwood we slacked to let some more men out; after this eight remained in the van. Speake was looking after the break. After passing the Leebotwood down distant-signal post, I felt the van begin to jump, and soon after this it turned over. I did not know the waggon was off the rails. My head was injured. I did not observe that the speed was faster than usual.

4. *John Hanson*, platelayer.—I joined the train (riding inside the van at the front end) at Church Stretton, where it slacked. Marston was not then in the van. The train slacked speed again near Leebotwood to let two men out. After passing Leebotwood I felt the van begin to jump about, and then turn over. I was hurt in the shoulder. I don't know when Speake put on the break.

5. *Samuel Speake*, platelayer, 18 years of age.—I was working with the joint ballast train on the Shrewsbury and Hereford line on the 21st July last. I was riding in the van with seven others. After passing Leebotwood station, I was looking out, and saw the waggon next to the van leave the rails; the leading wheels got off first. As soon as I saw this, I applied the break, and had no sooner done this than the van left the road, fell against a telegraph post, was dragged a short distance on its wheels, on the ballast, and then turned over on its left side; and I, being in the front part of the van, was shot out and injured. The guard in charge of the train was riding on the engine.

6. *David Austen*, waggon builder in the Joint Committee's service three years.—I saw waggon No. 14, a week before the accident, in a siding at Sutton Bridge. The waggon inspector called my attention to it, and asked whether he should put a new or old brass into the box on the leading wheel on the six-foot side. The old one I thought was good enough, and it was used again. I gave the waggon no further examination. It had been in the shops on the 15th May. It had then been lifted, and had fresh boxes and new brasses. I have seen the broken boxes, and think the one worst broken is a fresh flaw. The brasses do not give the appearance of the waggon having run hot.

Henry Marston, recalled.—I had picked up waggon No. 14 at Woofferton ballast pit. I had put it in the siding there on the 18th, because it had been running hot in the leading box on the right-hand side. I put some grease in the boxes. It did not run hot again after this. It had been loaded when it was running hot. I saw some of the boxes broken when I put grease in at Woofferton. I am quite sure I rode on the engine only from Church Stretton.

Conclusion.

From the foregoing evidence, and from an examination of the line, it appears that as the ballast train in question was travelling at a speed of about 20 miles an hour on a

falling gradient of 1 in 117, the last waggon left the rails about 800 yards north of Leebotwood station, followed soon after by the van, both vehicles then falling over on their left sides, and stopping about 330 yards from the first mark of any wheel having been off the rails. There was nothing in the condition of the permanent way, which is in very good order, to account for the accident, and its cause must be sought for in the waggon which left the rails. In this waggon three of the axle-boxes were broken,—one top and bottom, and the other two at the bottom. The springs were in good order. One shoe was gone from the trailing end of the off front spring, but this was picked up 60 yards south of the spot where the van and waggon stopped. This waggon had, by the guard's acknowledgment, been running hot on the day next but one before the accident, and he had in consequence then left it behind at Woofferton; and though he states that none of the axle-boxes were broken when he picked it up again on the day of the accident, it is more than probable that one of them was then broken, and thus gave rise to the accident.

Knowing how this waggon had behaved on the 18th, the guard ought to have given it a very thorough examination before deciding again to attach it to his train on the 20th. He is also to blame for being on the engine instead of in his van when the accident happened.

The Secretary,
Railway Department, Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major General R.E.

Printed copies of the above report were sent to the London and North-Western and the Great Western Railway Companies.

LONDON AND SOUTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, 24th June 1878.

I HAVE the honour to report, for the information of the Board of Trade, that in compliance with the instructions contained in the Order of the 6th instant, I have inquired into the circumstances which attended an accident that occurred on the 28th ultimo, in Fareham Tunnel, on the line between Portsmouth and Bishopstoke, of the London and South-western Railway, when the tender and the whole of the carriages of a passenger train left the rails.

It is stated that no persons were hurt on this occasion; but the whole of the carriages (8) were slightly damaged, and the crank pin of the driving axle of the engine was broken about $7\frac{1}{2}$ inches from its outer end, and the coupling rod, to which the broken piece of the crank pin was still attached, was very much bent.

The accident occurred about 207 yards from the Fareham end of the tunnel, and the train ran about 100 yards from the spot where the tenders and carriages left the rails, at which spot a broken rail was found, and a piece of that rail was found lying in the 4-foot space close alongside.

About 60 sleepers, and two thirds of the chairs in this length were damaged and broken; the broken chairs being mostly under the left rail.

The engine (the Isis) with a tender attached to the 6.30. p.m. passenger train from Portsmouth to Bishopstoke was a six-wheeled, four wheels coupled engine (driving and trailing wheels coupled), it had $15\frac{1}{2}$ in. cylinders and 20 in. stroke, with 3 ft. 6 in. in diameter for the leading wheels, and 6 ft. in diameter for the coupled wheels. The distance between the leading and driving wheels being 5 ft. 11 in. and that between the driving and trailing wheels being 7 ft. $6\frac{1}{2}$ in.

	Tons.	cwt.	
The weights on the wheels of the engine being	10	18	on the leading wheels.
	8	$19\frac{1}{4}$	„ driving „
	7	$6\frac{1}{4}$	„ trailing „
Total	27	$3\frac{1}{2}$	

This engine is about 20 years old, and it was last in the locomotive shops at Nine Elms for repair in April 1876, and in the Company's shops at Northam for a similar purpose in January 1878. It is stated that these crank pins as well as the axles are very carefully examined, when engines are sent into the shops for repair, for

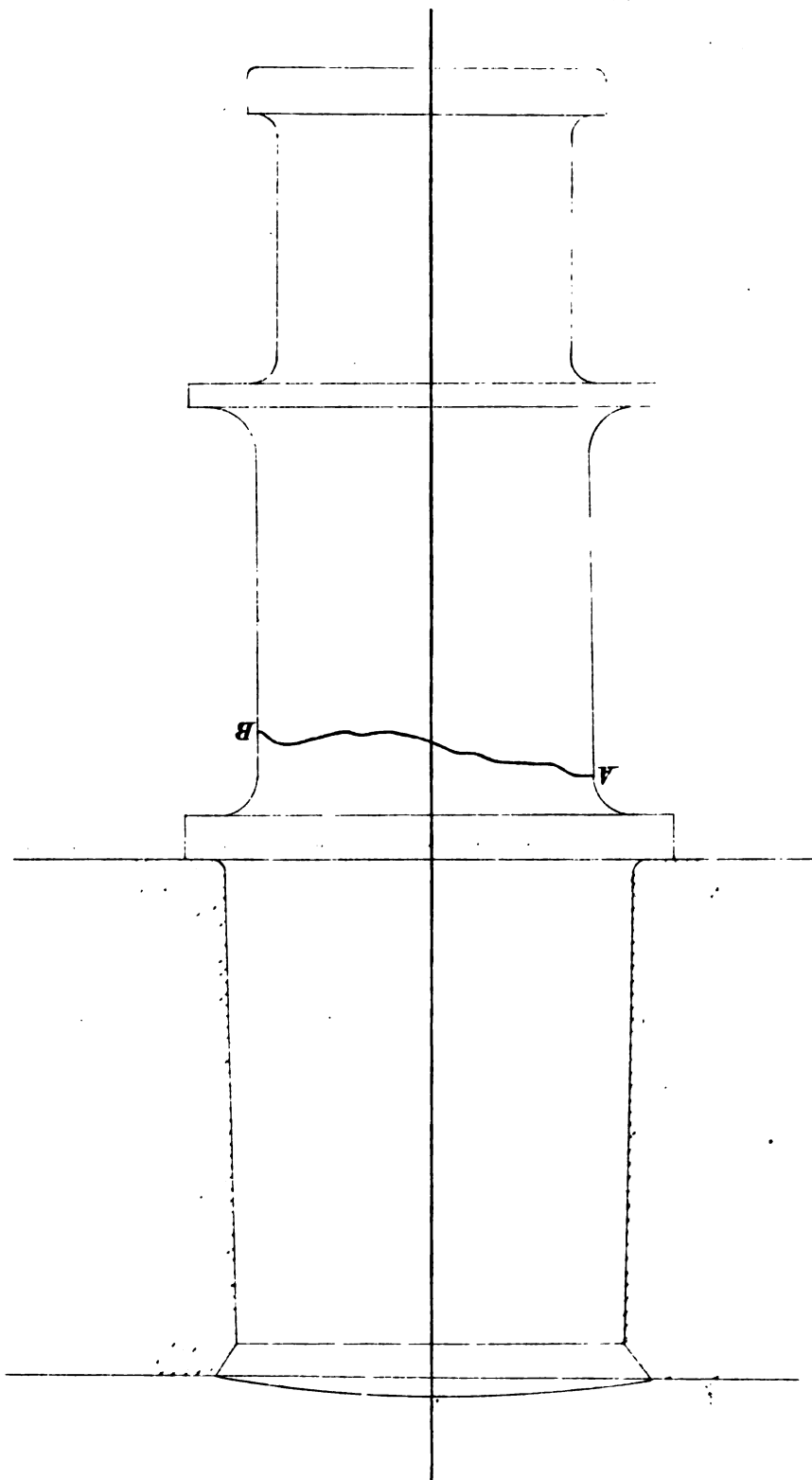
To accompany Colonel Holland's

LONDON & SOUTH WESTERN RY

Driving Crank Pin "Isis" Engine.

Half full size 17.6.78.

Accident in Fareham Tunnel.



Section through A.B. on line of fracture.



Note. Dark tinting shows old fracture
Light " " new "

the purpose of ascertaining whether any practical flaw or fracture extending to the outer surface has taken place. The engine had run 501,454 miles.

The permanent way consisted mostly of a 75lbs. double headed iron rail in lengths of 21 ft. placed on transverse sleepers 2 ft. 1½ in. apart, except at the joints, where they are 2 ft. 2 in. from centre to centre: seven sleepers being allowed to each rail. The broken rail was marked S.R.M. Co. date 1870, and it had not been turned.

The ballast was kept about level with the tops of the sleepers, that the fastenings might be readily seen.

The evidence in this case is as follows :

John Stokes, engine-driver, 31 years in the service of the company, and 19 years as an engine-driver, states that he was driving the Isis engine attached to the 6.30 p.m. train from Portsmouth Harbour to Bishopstoke on Tuesday the 28th May: the train consisted of an engine and tender and eight vehicles, including two break-vans with two guards, one break-van being next to the tender, and the other at the tail of the train: that he left Portsmouth Harbour at the proper time, and was also punctual in arriving at Fareham, but was two minutes late in leaving Fareham: that the commencement of Fareham tunnel is about three-quarters of a mile from the station, and he was running at moderate speed, nearly 20 miles an hour, when he found the engine suddenly drop as if it had dropped off the rails just for an instant, and then the tender left the rails: that he immediately shut off the steam, and his mate went to the tender-break, but he could not stand there from the motion of the tender off the rails: that he reversed the engine and whistled for the guard's breaks instantly, and the train came to a stand-still about 100 yards from the spot at which he had felt the engine drop; the engine still remained on the rails, the tender was off the rails but remained coupled to the engine, and the whole of the vehicles in the train were also off the rails, but continued coupled together: the tender and the other vehicles were all off the rails to the left, and some of the carriages had struck the side wall of the tunnel: he had not felt the engine lift at all, before he found it drop. When the train stopped, he examined the left-hand side of the engine, and he found the driving crank-pin was broken and the coupling-rod was doubled back: that his engine was a six-wheeled engine with four wheels coupled, the driving and trailing wheels being coupled, and he found the coupling-rod still attached to the trailing wheel crank-pin, but the coupling-rod had been bent outwards towards the side wall of the tunnel, and had marked the bricks in the wall as it revolved, and when the train stopped the end of the coupling-rod lay against the brick wall: that he then left the engine in charge of his mate and walked back along the six-foot space, as there was not room to walk between the side wall of the tunnel and the carriages which were off the rails, and about three carriage lengths in the rear of the last break-van he found a piece of a broken rail about six feet in length, lying in the four-foot space out of the left rail as they were running, opposite to the space from whence it had been broken: the broken piece of the crank-pin, nine inches in length, was found still attached to the leading end of the broken coupling-rod: that he did not look further back along the line than where the broken rail was found: that his engine stopped just under one of the shafts in the tunnel, and he did not notice whether the fish-plates were still attached to the broken rail, but the broken portion was at the leading end of the rail.

James Annett, signal foreman on the London and South-western Railway, states: that he was riding in the fourth vehicle from the tender of the 6.30 p.m. train from Portsmouth to Bishopstoke on Tuesday the 28th May: that everything was right until they had got nearly halfway through the Fareham tunnel, when he first heard something of a smash, and then the wheels of the carriage in which he was riding

appeared to strike the end of a rail, and he found the vehicle running off the road. When the train stopped he first went to the guard at the front of the train, and found him lighting his lamp, and he told him to go to Botley, the next station ahead; and then he walked back to the rear of the train, saw the assistant guard, who was ready to go back, and told him to wire to Mr. Wilmer the superintendent at Bishopstoke and to different other parties for assistance: then, after getting a tail lamp from the middle of the train, he told the passengers to keep their seats, and he then proceeded to examine the state of the line. He found the road had been broken up from the spot where a rail had been broken, about three carriage lengths from the rear of the train, to the front, and new sleepers and new chairs had to be supplied; the chairs were mostly required for the left rail: that he looked at the state of the road further back than where the broken rail was found, and saw nothing wrong: the fracture of the rail, was quite clean new, and there was no appearance of any flaw in it: but he did not notice how the rail was marked: the fish plates at the joint remained attached to the rail that was still in position, by one bolt, but the plates were bent inwards; the chair behind the fracture in the rail was all right, but the two chairs ahead were both broken, and that next the joint in the rail was found right against the right side wall of the tunnel; at least the inside part of that chair was found there, as it had been fractured directly under the rail. The piece of rail that was broken out had a slight crack in it about 15 inches from the end, and there was a bright mark as having been caused by a blow about 10 inches from the end at the outside top of the rail, close to the edge of the chair: he did not notice the fractured crank pin; the broken pieces of rail lay as shown in the sketch, and the end of the next rail ahead was also bent inwards, and had the marks of different wheels on its end. The carriage in which he was riding stood with one set of wheels in the six-foot space and the other in the four-foot, but most of the carriages stood with the left wheels outside of the left or near rail, as well as the tenders of the engine.

W. Neale, fireman to John Stokes, seven months a fireman, states: that the first thing that he felt was a sudden jerk upwards, and he was standing at the time on the foot-plate at the left side of the engine, as it was then running: that he immediately went to the tender-break for the purpose of putting it on, and by the time he got to the break-handle the tender was off the rails, and it shook the break-handle out of his hand: that they were running about 20 miles an hour at the time: that he did not go back to look to the state of the road, after the train stopped, and could not give any information respecting the engine.

Thomas Dickinson, head guard of the 6.30 p.m. passenger train from Portsmouth to Bishopstoke, on the 28th May, states: that they left Fareham all right, at the proper time 7.7, and he rode in the leading van, which was the fourth vehicle from the tender: they were arranged as follows, third-class, second-class, first-class, and then his van, then followed four other vehicles arranged in the same order, one front portion of the train going to London and

the other portion to Southampton : that when they were half-way through the tunnel, he found that his van was off the rails and bumping against the sleepers, and the top of it against the side wall of the tunnel : that he thinks he first heard the whistle sounded, and then he found his vehicle off the road : that he could not tell anything about the state of the road or of the engine, but he took immediate steps for pro-

tecting his train and keeping the passengers in their seats : he did not hear of any one being hurt.

The under guard in the van at the rear of the train found the speed slacken after entering the tunnel, and then he put on his breaks, but he did not hear any whistle from the engine.

From the preceding statements, and from an inspection of the broken left driving crank pin of the Isis engine, which is about $8\frac{3}{4}$ inches in diameter where the fracture took place, and also of the broken piece of the 75 lbs. iron rail which was found in the four-feet space between the rails, and opposite to the spot where it had been broken, I have arrived at the conclusion that the accident was caused by the breakage of the left driving crank pin of the engine. The fracture showed that a flaw had existed in this crank pin to the extent of about one half of the sectional area (see sketch), and when this crank pin broke, the leading end of the coupling rod, which is about eight feet five inches in length, dropped, and was forced into the ground or against the sleepers, and thus lifted the trailing end of the engine, and in doing so bent the coupling rod, and then allowed the engine to drop with a blow on to the rail, and broke it.

The fireman speaks to a "sudden jerk upwards," and the driver says he found the engine "suddenly drop." But it does not appear that the engine ever got off the rails, and it could not drop on them, until it had previously been lifted above them.

The crank pin had probably been gradually weakened as the fracture increased by continuous wear and tear, so that the flaw had at the time of the fracture extended to one half of its area. On the other hand, the rail was completely broken through about 6 feet from its leading end, and there was a slight fracture of the outside of the top flange of this rail, about 15 inches from the leading end, and it is stated that there was a distinct mark of a blow near this fracture.

In both the crank pin and the rail the quality of the iron appears to have been good. In the rail there was no appearance of any flaw, and the metal looked bright and clear.

The tender and the carriages all got off the rails, where the broken piece of the rail was knocked out of its place, and the adjacent end of the next rail ahead is said to have exhibited the marks of sundry wheels running over it.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,

W. YOLLAND,
Colonel, R.E.

Printed copies of the above report were sent to the Company on the 10th July.

LONDON AND SOUTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, Whitehall, London, S.W., 5th August 1878.

I have the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 17th ultimo, the result of my inquiry into the circumstances connected with the fatal accident which occurred to Richard Furmidge, a guard in the employ of the London and South-Western Railway Company, on the 22nd June, near Fulwell station, on the Thames Valley section of that company's lines. This guard is stated to have been a man of good character and an excellent servant of the company.

The London and South-Western Railway Company were at the time when this accident occurred engaged in doubling the line between Fulwell and Sunbury stations, and also in renewing some of the over-head timber foot-bridges; and it is stated, that the old wooden bridge about three quarters of a mile west of Fulwell station, had been originally supported nearly midway between the brick piers by upright framed timbers, but I have not been enabled to obtain any drawings of this old structure, showing at what distance these timbers had been placed from the rails.

When renewing this bridge it became necessary to erect scaffolding for supporting the new beams which were intended to replace the old ones, and for removing the latter.

Richard Furmidge was the under guard of the 10.1 p.m. up passenger train from Shepperton to Twickenham on the night in question, and rode in the last van, which had four carriages behind it. He was found to be missing when the train reached Twickenham station, and his body was discovered by the watchman a few yards on the eastern side of this over-bridge, partly lying across the rails, from whence he removed it before the next up train appointed to leave Shepperton at 10.35 reached the spot.

It also appears that the engine of this last train struck a scaffold pole in passing under this bridge, and some damage was done to the train.

The evidence in this case is as follows :

Francis Tayler, superintendent of permanent way, engaged in laying down the second line of rails between Fulwell and Sunbury in the Thames Valley line, states : That two over-bridges between Hampton and Fulwell, which had timber tops and brick abutments and piers, were being renewed, the timbering being all new : and to do this, it was necessary to put up scaffolding, and scaffold poles were put up in the 6-foot space between the up and down lines : and that these scaffold poles at the bridge nearest to Hampton station would be on the right side of a train travelling from Sunbury to Fulwell. There were four poles in the 6-foot space placed longitudinally : that these poles were intended to be put up at a distance of 3 feet 3 inches from the outside edge of the southmost rail of the single line, the running line : that these scaffold poles were all removed when he went to the spot after the accident had occurred on Saturday the 22nd June : the guard who was killed was guard of the 10.1 p.m. up train from Shepperton, and he does not know in what manner he was killed : he did not hear of the accident until the following Monday.

William Harrison, engine-driver of the 10.1 p.m. train from Shepperton on the 22nd June, states : That as they were stopping at Fulwell he missed the application of the break power : his train consisted of a tank engine and 16 carriages, with two guards ; and the guard who was killed was riding in the last break : that they reached Fulwell station about 10.20, and when he went on with his train he was not aware that the guard was not with the train : that he felt nothing unusual as he was approaching Fulwell station : there was nothing wrong with the scaffolding at the over-bridge nearest to Fulwell as he passed under the bridge, to his knowledge.

William Smith, fireman to W. Harrison, confirmed the driver's statement.

James Daly, head guard of the 10.1 p.m. up train from Shepperton to Waterloo Bridge station on the 22nd June, states : That he rode in the composite van next to the engine. There was a tank engine, 14 coaches, and two vans in their train : and he was not aware that anything was wrong as they approached Fulwell station : and he did not know that his mate, riding in the last van with four coaches behind it, was missing when they left Fulwell for Strawberry Hill, and he did not find out that he was not with the train until the train reached Twickenham. He thought there was something wrong, as his mate did not answer his signal while running between Strawberry Hill and Twickenham : that he does not know in what manner his mate met with the accident : that he could not say whether both doors of the rear-guard's van were shut at Fulwell : he did not notice, but both doors were shut when he got into the van at Twickenham.

George Stacey, engine-driver of the 10.35 p.m. up train from Shepperton to Waterloo, states : That his train consisted of a tank engine and five carriages with one guard riding in the last vehicle : that they left Shepperton at the appointed time, stopped at Sunbury, and as they were approaching Fulwell station, when

running at about 20 miles an hour something struck the chimney of his engine : that he was running with the chimney in front, and this occurred as they were passing under the over-bridge near Fulwell, where some scaffolding had been erected : that the chimney was struck by a scaffold pole, he did not see it before the chimney was struck. The chimney was sprung backwards about an inch, the head lamp on the front of the chimney was smashed, and a piece of the scaffold pole about three feet in length passed through the glass of the weather board, at the left side of the engine as they were running, and stuck in the carriage behind the engine : a deep dent was made in the large brass tube, the middle one over the fire-box : this occurred about 10.42 p.m. : that he could not see anyone about the spot when this happened, and when he got to Fulwell he spoke to the station-master and some of the porters about it : but no one mentioned that anyone was missing from a preceding train. When they got to Twickenham the station-master there told them that the guard of the preceding train from Shepperton was missing, and then the station-master sent an inspector back to see for the guard. There was no other train which passed in either direction between the 10.1 p.m. and the 10.35 p.m. trains between Shepperton and Fulwell stations : that he took the inspector back as far as Strawberry Hill station, and then the inspector started to walk. That he was not aware of any accident to the guard until the next morning.

Daniel Pickles, fireman to George Stacey, confirmed the driver's statement.

Arthur Charles, guard of the 10.35 p.m. up train from Shepperton to Waterloo Bridge station on the 22nd June, states : That his train consisted of a tank engine and five carriages, and he rode in the hind van, and, as they were approaching Fulwell station, something struck the roof glasses in the centre of the top of the van, and broke three of those glasses : that they were running at the time at the rate of from 20 to 25 miles an hour, but he does not know what it was that struck the roof glasses. He thought at the time that some one must have thrown a stone off the over-bridge. When they reached Fulwell he went forward, and saw the driver, and he asked if there was not something wrong at the over-bridge, but he did not go back to see what was the matter, and he does not know how the accident happened : that it was dark when he made the last journey down to Shepperton, and could not say anything as to the state of the scaffolding.

George Wright, station-master at Fulwell five years last February, states : That he was on the platform when the 10.1 p.m. up train from Shepperton arrived, and after looking after the passengers he missed the guard's lamp at the rear part of the train, and he called the head guard and told him that he could not get any light from the guard at the rear of the train : that he could not say that the guard was missing from the train, and he did not send anyone back towards Shepperton before the 10.35 p.m. up train arrived at Fulwell. That train is due there at 10.51, but it was about seven minutes late. When the 10.35 p.m. up train

arrived, the guard told him that there was something amiss at one of the bridges, but he did not know which bridge it was, and he having made the line safe by signals, and by locking up the train staff, then walked down the line towards Shepperton, and before he reached the first over-bridge from Fulwell some one told him that a man had been killed, and when he reached the first over-bridge he found that the scaffolding had been knocked away, scaffold poles were hanging down on each side of the line, and he was told that the guard of the 10.1 up train from Shepperton had been found in the 4-foot space, and had been removed by a man of the name of Smith, the watchman at the bridge: that he had been removed out of the 4-foot space to the side of the line before the last train, 10.35 p.m. from Shepperton, had got there, and he found a doctor there attending to the guard. The guard was not in a condition to give any information respecting the accident to himself when he got there, and he does not know by what pole or poles the guard was struck. The door of the van in which the guard was riding on the left or north side of the train was shut when it reached Fulwell, but he could not state how the doors were on the south side of the train, whether open or shut. There was nothing on the line in the shape of poles lying on the rails when he got to the bridge.

Charles Smith states: That he was acting as a watchman at the over-bridge three-quarters of a mile from Fulwell station on the 22nd of June, and he was on the roadway above the railway, for the purpose of cautioning people who required to pass along this over-bridge: that he noticed the 10.1 p.m. train approaching the bridge, and he walked along the road from the south side to the north side: that there were only scaffold poles across at that time—no planking—so that no vehicle could pass along the road,

nothing but foot passengers, and he did not allow anyone to cross; that on looking towards Sunbury perhaps 20 minutes or a little less after the 10.1 p.m. train had passed, he saw the body of a man lying in 6-foot space and his head lay across the rails of what is now the up line. He went down at once and moved him off the running line to the other line, which was not then in use: that he never spoke or moved: that he had a lamp with him, but he could not see that at that time the scaffold poles had been moved at all: there was blood on two scaffold poles and also on the timber uprights of the old bridge: that the guard's head and arm were struck by a scaffold pole, his body was found on the Fulwell side of the bridge about three yards from the bridge: that he did notice that the 10.35 p.m. up train did any damage to the scaffolding as it passed through, but after it had passed through it was found to have been knocked about a good deal and it had to be put right before the next down train passed. A gentleman of the name of Miller who lived near the bridge heard the concussion between the 10.35 p.m. up train and the scaffold poles, and he went and fetched a doctor, who pronounced the guard dead when he got there.

Guy Wm. Poole, foreman for Mr. Perry who had the contract for repairing the wooden over foot-bridges, states: That the scaffolding which was put up at this bridge was placed in what is now the 6-foot space between the up and down line: there was one scaffold pole on each side newly put up, besides the old timbering that supported the middle of the old foot-bridge, that the scaffold poles stood 3 feet 2 inches from the outer side of the right rail of the running up line—or perhaps rather more—there were two standard and two die square timbers, braces, &c., in what is now the 6-foot space.

From the preceding statements it is evident that this poor man was killed while passing under the over foot-bridge, probably in the proper execution of his duty, while looking out of the window of the van, when his head came in contact with some portion of the scaffolding which must have been most improperly placed too close to the south rail of the up line.

This is evident, even from the statement of the foreman of the contractor who was engaged in renewing this over-bridge, as he states that the scaffold poles stood 3 feet 2 inches from the outer edge of the rail, and as the width of the body of the van in which the guard was riding was 8 feet, this would only admit of a clearance of 1 foot 8 inches between the outside of the body of the van and the stated position of the scaffold pole; instead of being 2 feet 4 inches, as stipulated for in the 22nd requirement of the Board of Trade, which says, "No standing work (other than a passenger platform) should be nearer to the side of the widest carriage in use on the line than 2 feet 4 inches, at any point between the level of 2 feet 6 inches above the rails and the level of the upper parts of the highest carriage doors. This applies to all arches, abutments, piers, supports, girders, tunnels, bridges, roofs, walls, post tanks, signals, fences, and other works, and to all projections at the sides of a railway constructed to any gauge."

From the fact that the engine of the 10.35 p.m. up train from Shepperton, which followed the train 10.1 p.m. to which the deceased belonged, coming in contact with some portion of the scaffolding at this over foot-bridge, I cannot but conclude that it was not only improperly erected too close to the rails of the running line, but was not even properly secured.

I have, &c.,

W. YOLLAND.

Colonel.

The Secretary,
(Railway Department,) Board of Trade.

Printed copies of the above report were sent to the Company on the 22nd August.

LONDON AND SOUTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., 17th July 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 10th instant, the result of my inquiry into the circumstances which attended a collision that occurred on the 5th instant at Sunbury station, on the Thames Valley branch of the London and South-Western Railway, between a passenger train and some ballast trucks, which were standing in a siding then in course of construction, at the eastern end of the station.

Four passengers are stated to have been slightly injured on this occasion, and two of the ballast trucks were thrown off the rails, a buffer of a third truck was knocked off, and the frames of the whole of the carriages in the passenger train (12) are said to have been slightly damaged.

The London and South-Western Railway Company were engaged, at the time when this collision occurred, in laying down a second line of rails between Fulwell and Sunbury stations, on the Thames Valley branch, and in increasing the accommodation at Sunbury station, more particularly for the increased traffic likely to be brought there, in connexion with the intended new race meetings, proposed to be held at intervals throughout the year at Kempton Park.

The evidence in this case is as follows :—

Thomas Franklin, engine-driver, 3½ years in the service of the Company as an engine-driver, states : That he was driving the 4h. 10m. p.m. down passenger train from Waterloo Bridge station to Shepperton on the 5th instant : that his train consisted of a tank engine, No. 196, one horse-box next the engine, and 12 carriages, two of the carriages having break compartments : that the train stopped at Hampton station and left at 4h. 51m., about one minute late : that on nearing the down distant-signal he saw that it was on at "danger" against him, and he shut off the steam and prepared to come into the station slowly, knowing that alterations were in progress at the station : that he was approaching the station on the single line which is now the up line : that on nearing the over bridge he opened the small whistle to draw the attention of the workmen to the fact that he was approaching, and then the men walked off the line, and he then observed that the facing-points under the bridge, leading into the new horse and carriage siding, were set wrongly for his train : that he was coming in very quietly, and was not running more than about 6 miles an hour when he first saw the points were wrongly set, and he was proceeding so slowly that he would have had to put on the steam again to take his train into the station : that he then sounded the break whistle sharply, and his mate, who also saw that the points were wrongly set, put on the engine break, and he might be running from 3 to 4 miles an hour, when his engine struck the ballast trucks : two of the trucks at the advanced end were raised up in the air, but he is not aware that any others were thrown off the rails : that the frames of all the carriages in his train were slightly damaged : that he was not more than 30 yards from the points when he first saw that they were wrongly set. The collision occurred about 5 minutes to 5 o'clock. The buffer plank of his engine was splintered on the left side. The last ballast waggon was standing about from 20 to 30 yards from the points.

John Parratt, foreman of the ballast train, two years as foreman, and nine years last June in the company's service, states : That about 4h. 40m. p.m. on the 5th instant he was in charge of a ballast train, and was approaching Sunbury from the direction of

Hampton station : that he was riding on the engine, and the signals were off for the train to enter the station, and he passed over the first pair of facing-points that lead to the down platform, and then he roped seven waggons, by means of the second pair of facing-points, into the new horse and carriage dock which was then in course of construction : that he had previously fixed the second pair of facing-points open for this siding, by means of a wooden plug, the arrangements for working these points by levers not having then been completed : that he had been in the same siding for the same purpose several times, once previously during the same day, and this was the last time that it would be required on that day : that he and his flagman forgot to take out the wooden plug after having roped the seven waggons into the siding, as he was in the habit of doing ; and he did not recollect that he had left the points set open for this siding until he heard the break whistle sounded from the passenger train engine about 4h. 50m. p.m., and this whistle was sounded as the engine was approaching those points : that he thinks the passenger train engine was not running more than 4 or 5 miles an hour when the passenger train engine ran into the ballast trucks : that two waggons were knocked off the rails at the advanced end, and those two waggons were slightly damaged ; and a buffer of a truck that was run into by the passenger train engine was knocked off : neither the engine nor any of the coaches of the passenger train were thrown off the rails.

George Matthews, head guard of the 4.10 p.m. train, three years a head guard, states : That he rode in the carriage next to the horse-box at the front of the train, which consisted of engine, horse-box, and 12 carriages : that he put on his break just before he got to the distant-signal, which was on at "danger" against them, and kept it hard on : that he was not aware that anything was wrong until the driver whistled, just as they approached the facing-points leading into the siding : that he was holding on to the break when the collision occurred : it was not a very sharp collision : that they were not running at more than five miles an hour when it occurred : that five or six of the carriages were slightly damaged. The collision occurred about 4h. 55m. p.m.

From the preceding statements it appears that this collision was caused by the forgetfulness and carelessness of the foreman and flagman belonging to the ballast train, engaged in carrying stuff for the formation of a new horse and carriage dock

siding, lying on the north and east side of Sunbury station, in having failed to take out the wooden plug which had been used to set the points right for the ballast trucks to enter that siding, when the ballast trucks had been roped into the siding, and to have neglected to set these facing-points right for the down passenger train to run into the Sunbury station.

The collision appears to have been a slight one, and it would probably have been avoided altogether if the passenger train had been fitted with continuous breaks throughout the train placed under the control of the engine-driver, as, according to the evidence, he would have had 40 or 50 yards to pull up in after he saw that the points were wrongly set, when he was running at the rate of five or six miles an hour.

I cannot however learn, that the London and South-Western Railway Company, are doing anything at the present time, as regards the fitting up their passenger trains with any of the continuous breaks now in use, partially, on some of the principal railways in the United Kingdom.

The Secretary,
(Railway Department),
Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 7th August.

LONDON, BRIGHTON, AND SOUTH COAST RAILWAY.

SIR,

Sandown, 17th August 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 6th instant, the result of my inquiry into the circumstances which attended a collision that occurred on the 5th instant, at the Bricklayer's Arms junction of the London, Brighton, and South Coast Railway, between an up excursion passenger train from Brighton to London Bridge and two light engines belonging to the South-eastern Railway Company, which were in the act of shunting from the down main line to the up main line, on their way to the Bricklayer's Arms branch and goods yard and station; and one of these light engines was subsequently run into by a London, Brighton, and South Coast light engine, on its way from London Bridge to New Cross, on the down local line, across which one of the South-eastern Company's engines had been knocked by the first collision.

The collision is said to have occurred about 142 yards north of the up home-signals.

It is stated that 168 passengers were injured; some of the injuries received appear to be serious ones, but it is hoped that none may prove fatal.

The South-eastern Railway Company's engine No. 35, which was first run into by the London, Brighton, and South Coast Company's tender engine No. 240, drawing the up excursion train from Brighton, and knocked off the rails, driven northwards, so as to be foul of the down local line, had the right side leading and driving axle-boxes broken, the outside crank in driving axle knocked off and broken, side rod broken, framing damaged, crank axle bent, and both left outside cranks shifted and bent. Its tender had the right side horn-plate and three axle-boxes broken, framing stays and break gear damaged, leading axle bent, and the back of the tender stove in and very much damaged.

The London, Brighton, and South Coast Company's engine No. 240, "St. Leonards," had its machinery bent and damaged, and the clack-box by the side of the boiler knocked off, but the damage was comparatively slight; while the same company's tank engine No. 117, "Florence," which ran into the South-eastern Company's engine No. 35, after it had been knocked off the rails and had fouled the down local line, had one of its cylinders broken and the smoke-box damaged, one of the springs and part of the framing carried away, and it is stated that this engine will have to be taken entirely to pieces for repairs. The damage to the carriages in the passenger train was very slight; and the permanent way was also damaged.

There are three lines of railway between London Bridge and the Bricklayer's Arms junction, which are used in common by the London, Brighton, and South Coast and the South-eastern Railway Companies, two up and one down line; the part between London Bridge and Corbet's Lane, north of, but near the Bricklayer's Arms junction, belonging to the South-eastern Railway Company, while the adjacent part between

Corbet's Lane and Stoats Nest, south of Croydon, belongs to the London, Brighton, and South Coast Railway Company.

About 28 yards south of the signal-box at the junction the down main line is joined by a pair of facing-points leading to a down local line, on the eastern side of the down main line; and about 140 yards south of the signal-box on the down main line there is a pair of trailing points of a cross-over road that leads back in a northerly direction to the adjacent up main line, and this cross-over road forms the first part of one of the routes by which a light engine on its way to the Bricklayer's Arms branch (which quits the main lines nearly opposite to the junction signal-box) must take, and then passes from it by another pair of facing-points on the up main line, placed about 30 yards south of the signal-box, to the Bricklayer's Arms branch.

The Bricklayer's Arms junction is protected from the south by up home and up distant signals; the up home-signals are about 250 yards south from the centre of the signal-box, and the up distant-signals are 490 yards south of the up home-signals, erected overhead and across the four lines of railway.

The passage from the down main line to the up main line, by the cross-over road before referred to, is governed by a disc-signal placed on the ground in the 6-feet space, between the down main and down local lines, a few yards south of the trailing points; and this disc-signal only exhibits a green light, when a light engine may safely cross from the down main line to the up main line, towards the Bricklayer's Arms branch. From the interlocking of the points and signals, this disc-signal can only be turned so as to exhibit the green light towards a light engine standing on the down main line, waiting to cross to the Bricklayer's Arms branch when the up main line signals are "on," or, in other words, standing "at danger."

The evidence in this case is as follows:

Edward Rhodes, signalman 27 years in the Bricklayer's Arms junction box in the service of the Brighton Company, and four or five years previously in the same service, states: I came on duty at 2 p.m. on the 5th instant, and two South-eastern engines arrived at the Bricklayer's Arms junction from London Bridge at 7.50 p.m., intending to go into the Bricklayer's Arms station: these engines were coupled together and were signalled from the Blue Anchor box at 7.46: they stopped clear of the points that lead from the main down line into the Bricklayer's Arms branch, moved by lever No. 18. The disc-signal was on against those engines, and I showed them a red light with a hand signal lamp. The disc-signal was not turned so as to show the only light which is exhibited from it, namely, a green light. I saw that the light in that disc-signal had been lit before those engines arrived. A porter comes up from New Cross every night to light it. He lights all the signals at that junction. A Brighton up special was signalled from Forest Hill as leaving at 7.44, was given on from New Cross at 7.45, clear signal given to New Cross at 7.45, and signalled from New Cross as having left at 7.50. The engines still stood on the down main line for a Brighton up train to pass—a Brighton special (an excursion train); and as soon as the Brighton up special had passed the up junction-signal, I cleared the line to Blue Anchor for another down line engine to come on, which was to pass along the down local line. I did not see the two engines move towards the signal-box, either on the line on which they had ran down, nor by any other line. I saw one of these engines driven up towards my box by the Brighton train engine. I had not heard any whistle from the driver of the two engines. I heard a whistle from the drivers of the Brighton train engine, a very shrill whistle; I believe it was a whistle for the breaks. That train had stopped at New Cross; it was not running fast, not more than 10 miles an hour. The distant and home signals were both off for that train. A local up train had gone up after the engine had arrived, and it passed three or four minutes before the collision took place, about 7.56. There is an entry of 7.49 signalled from Forest Hill from Croydon on the local line. I do not make the entries in the signal book; a boy makes them. I placed the red lamp on a little shelf in the signal-box used for that purpose, and I had not moved it before the collision occurred.

The disc-signal is always taken off for trains to run on to the Bricklayer's Arms branch, and they are not signalled to come back by hand lamp alone. When they are wanted to come back the disc-signal shows a green light, and I also show a green light by my hand lamp; that is the practice. I never use a white light.

Edward Maughan, engine-driver 30 years, 16 years on the Brighton line, states: I was driving engine No. 240 in front of an excursion train from Brighton, which consisted of 13 vehicles, including two break carriages with two guards. We left Brighton at 6.15 p.m., and reached New Cross at 7.47 p.m.; stopped not much more than a minute. The Bricklayer's Arms junction signals were off for us when we got to New Cross, and they continued off for us to proceed, and we had passed the overhead up signals worked from the junction-box before I saw that anything was wrong. Those signals were off when we passed them. My mate called out to me that there was something wrong with the two engines, and I saw that they were foul of the road, and I called out "Hold on!" I think I was running about 20 miles an hour when my mate called out. There was no steam from those engines, and I cannot say whether they were standing still or moving. I shut off the steam, blew the whistle, and reversed the engine. It was a light night, but when I saw the signals on arriving at New Cross I saw both lights and arms. The main up signal is a green light. I think the collision occurred at 7.51. My engine was not thrown off the road, nor any of the carriages. Mine was a tender engine; it was damaged on the right side. My engine struck the northernmost of the two engines, and broke the coupling between the two engines. The two engines were both tender engines, standing with their chimneys to the south. I was not hurt, neither was my mate. I did not notice the disc-signal, and did not go near it.

Hercules Wright, platform porter at New Cross, states: I lit the signals at the Bricklayer's Arms junction at 7.30 p.m.; the disc-signal that governs the cross-over road from the down main to the up main line was lit, and when I closed it the light was burning. I got back to New Cross at five minutes before 8 o'clock, at which time it was quite daylight.

Edward White, fireman to *E. Maughan*, confirmed the driver's statement as to seeing the up signals off, when they were at New Cross, and when they passed them: I observed that the two engines were foul of the line on which my train was running, as we passed under those signals. I believe those engines were standing still, as I saw no steam from them: we were running at the time at about 20 miles an hour. The signals all had lights in the lamps. I did not see the disc-signal, on account of the two engines. The driver shut off the steam, whistled, and then reversed the engine, and I put on the tender break, and we were running nearly at the same rate as before. The collision occurred about six minutes to 8 o'clock. Our engine struck the engine nearest to London, and knocked it off the rails—knocked the tender of that engine all to pieces.

Thomas Miller, engine-driver about nine years, and 6½ years in the service of the South-eastern Railway Company, states: I was driving engine No. 35 from Cannon Street going to the Bricklayer's Arms station, and my engine was coupled to another engine in front; and we arrived at the Bricklayer's Arms junction at 12 minutes to 8 o'clock, and stopped over the points of the cross-over road that leads to the up main line. There was a red light in the signal-box when I stopped. The down junction-signal for the down main line on which we ran was lit, and showed us a green light: the red light in the box was that of a hand-lamp. I did not notice the up main-signal. We stopped about 1½ minutes clear of the points, and then the points were shifted for the Bricklayer's Arms branch, and they shifted the disc-signal, but there was no light in it, and then took the red light out of the signal-box, and showed me a white light: then I went steadily back, as my mate was shifting his lamp at the time. Just as we began to move, my mate jumped up and said, "The other train is coming into us." I had not seen the Brighton train coming before my mate called out. I then reversed the engine and put steam on the reverse way. I can't say whether the Brighton train was running against the signals or not; I had not time to look. I think the Brighton train was travelling about 25 miles an hour by the way it dragged my engine. The coupling between my engine and the other engine was broken: this occurred about 10 minutes to 8 o'clock. The disc-signal ought to have shown me a green light: the bull's-eye was turned towards me, and there was no light in it. I never heard any whistling from the Brighton train. After the Brighton train had dragged me to within about 12 yards of the signal-box, and about a minute afterwards, another engine belonging to the Brighton Company ran into my tender; neither my mate nor myself were hurt. I was going to the shed at the Bricklayer's Arms station, and then home. I had come on duty at 1 p.m. I saw the disc-signal shifted. I don't think the Brighton men knew whether the up signals were right for them or not. The two guards of the Brighton train, when asked, did not know whether the signals were right for them or not. They went into the signal-box and asked the signalman whether the signals were right for them or not. I heard them say that they had been in the signal-box, and had asked the question of the signalman. The driver and fireman of the Brighton engine were sober enough. I did not take notice of the guards, but only noticed what they said.

I did not notice the up signals whether they were on or off. I have been running to the Bricklayer's Arms station by that junction for five or six years, and understand all the signals: they usually show a white light from the box when all is clear to go into the branch, and a green light when there is anything on the branch. We never move until the disc-signal is moved.

John Openshaw, fireman to *Thomas Miller*, states: I saw the red light shown when they stopped over the points, but I did not see the disc-signal, nor any white light in the signal-box. I warned the driver that the Brighton train was coming, but did not notice how the up signals stood for the up main line. I warned him that the train was coming, and that he was foul of the line; he came and looked, and then set back. The driver and fireman of the Brighton engine were perfectly sober, and the guards also seemed sober. I did not see the points shifted. I went round the engine to shift my lamp. I did not look for the signals. I said, "I am all right when you are." I think we did not stop more than 2½ or 3 minutes altogether.

George Shilling, engine-driver 2 years, states: I was driving tender engine No. 131 from Cannon Street to the Bricklayer's Arms branch, and my engine was in front. We got to the junction about 5 minutes to 8 o'clock. When we went over the points the signalman put a red light in the window, and when I looked again at the window the signal was gone. I looked when the other driver began to move backwards. I told my mate to put a red light on behind our engine. I went to see if he was coming back, and then I saw the Brighton train coming, at which time we were moving slowly. I did not look to see how the signals were for the Brighton train; they were on when we got to the junction. I did not see the disc signal at all, I did not see any white or green lamp shown from the signal-box. When I saw the Brighton train coming I reversed my engine and gave her steam, and we had stopped before the collision occurred. I knew that we were crossing to the up line when we moved back. There was time enough after I first saw the red light in the signal-box for a white light to be shown. When I missed the red light I thought the other driver had received the proper signal to go across to the branch. I have not been much to the Bricklayer's Arms lately.

Wm. Smart, eight years a guard in the service of the Brighton Company, head guard of the 6.15 p.m. up excursion train from Brighton, which consisted of engine and tender and 13 vehicles: I rode in the third-class break next the tender: reached New Cross at 7.49, stopped there two minutes, and before I gave a signal to the driver to start, I noticed the Bricklayer's Arms junction up signals, distant and home, were both off, and they continued off until we got by them. I became aware that something was wrong, when I heard the driver whistle. I can't say where we were when I heard the whistle, about 80 yards from the point where the collision occurred. I put on my break, and we were running at from 15 to 20 miles an hour when the collision occurred at 7.53. The driver and I went to the signal-box and asked the signalman if the signals had been all right for us. I asked the question so as to be sure. He said they were off for the up Brighton excursion train. I was sober and not under the influence of drink.

From the preceding statements, and from personal inquiries, and an examination of the locality at which the collisions occurred, it appears that the first collision between the up excursion train and the northmost of the two light engines was caused by the driver of the northmost light engine having proceeded to back his engine along the cross-over road between the down and up main lines at the time that "train on line" had been received from New Cross, and the up distant and up home signals were "off" or at "all right" for an up excursion train to pass on its way to London Bridge from Brighton.

The Brighton Company's regulation at the Bricklayer's Arms junction for the

working of the traffic with the Bricklayer's Arms branch from the down lines is as follows :

"17. On the arrival of a down train of South-eastern Company's empties or an engine, and the train or engine being sent on to the down local line to shunt back into the Bricklayer's Arms branch, the 'line clear' signal must not be given back to Blue Anchor signal-box until such train or engine has been shunted back into the branch, clear of the down local and main lines. On the arrival of a down train of South-eastern Company's empties or an engine, and the train or engine is turned on to the down main line to shunt back into the Bricklayer's Arms branch, the signalman must not pull over No. 18 points if he has previously given the 'clear' signal for an up main line train to approach until such up train has passed his junction. Nor must he give the 'clear' signal back to Blue Anchor signal-box while the train of empties or engine is standing on the down main line until No. 18 points have been pulled over ; nor, under any circumstances, must an up train be allowed to pass on the up main line while the empty train or engine is standing on the main down line after No. 18 points have been pulled over."

This instruction was drawn up for the guidance of the signalmen in the Bricklayer's Arms junction signal-box, and it appears to me certain that if it had been strictly observed no collision would have occurred on the 5th instant. And it is equally certain that as soon as the two light engines had passed over the trailing points of the cross-over road, moved by lever No. 18, and had stopped, those points were at once shifted, and shortly afterwards the Driver Miller, of the northmost light engine, proceeded to back it towards the up main line, and thus fouled it.

This driver asserts that the disc-signal which is placed in front of those points was shifted, and that he saw it shifted, but that the light, which, as I have explained, should have been a green light, was out, and that the red hand-lamp at the signal-box had been replaced by a white light before he proceeded to back his engine along the cross-over road, and thus fouled the up main line, at the time when the up main line signals (distant and home), according to very distinct and conclusive testimony, were both off for the up excursion train to pass. This driver's statement, in this respect, is not supported by anyone, although there was another engine-driver and two firemen belonging to the two South-eastern light engines. There is, on the other hand, the direct statement of the porter from New Cross that he lit the lamp in the disc-signal at the same time as he lit the other lamps at the junction, and it was found burning by the District Locomotive Superintendent, Mr. Trangmar, some time after the collision had taken place, and the interlocking of the points and signals in the signal-box renders it impossible to take off the up distant and up home signals, while the disc-signal green light is shown towards the light engines, or to exhibit the green signal to the light engines when the up main line signals were off for the up excursion train. On these grounds I have arrived at the conclusion that Driver Miller's statement is not correct as to his having had permission from the signalman to cross to the up main line, by the disc-signal being turned towards the light engine in order to show him a green light, and that the collision between the up excursion train engine and his own engine was the result of his own carelessness and neglect.

The effect of the collision was to snap the coupling between the two light engines, and to knock the northmost one off the rails of the cross-over road, and to drive it ahead to within a short distance of the junction signal-box, where it stopped foul of the down local line, where it was almost immediately afterwards run into by one of the Brighton Company's engines on its way from London Bridge to New Cross, and its tender was greatly damaged.

The excursion train was not provided with a sufficient amount of break power, but the distance was too short for the collision to have been altogether avoided if the train had been fitted with continuous breaks under the control of the engine-driver.

This collision fully illustrates the risk to which the public have been subjected for a large number of years past, by the practice followed by the South-eastern Railway Company of sending some of its light engines and empty passenger trains between London Bridge and the Bricklayer's Arms station by way of this junction, to which my attention was called by your Minute of the 19th July, on the representation from the London, Brighton, and South Coast Railway Company, dated the 18th July, of the danger to which the public would be subjected at this junction by the commencement of a new service of Great Northern goods trains to the Bricklayer's Arms station. Fortunately there have not been any fatal cases among the passengers injured, and it is to be hoped that arrangements may be made without delay by the London, Brighton,

and South Coast, and the South-eastern Railway Companies, by which this mode of reaching and leaving the Bricklayer's Arms station for the traffic between it and London Bridge will be done away with.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 26th August.

MANCHESTER, SHEFFIELD, AND LINCOLNSHIRE RAILWAY.

Board of Trade, (Railway Department,)
13, Downing Street, London, S.W.,

SIR,

19th September 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 5th instant, the result of my inquiry into the circumstances attending an accident which occurred on the 4th instant to a goods train at Stairfoot, near Barnsley, on the Manchester, Sheffield, and Lincolnshire Railway.

In this case, as the Manchester, Sheffield, and Lincolnshire up night goods train from Pennistone to Wombwell, consisting of engine and tender, running tender first, 40 empty goods waggons, and one break-van in rear, was approaching Stairfoot station at 8.2 p.m., the leading wheels of the engine, as it was then running, left the rails, and it ran with these wheels off until it struck against a crossing and was thrown off into a colliery siding, breaking the coupling connecting it with the tender, which kept the rails.

The fireman, who was thrown off the tender, was killed on the spot. Fourteen of the waggons were thrown off the rails, blocking both lines; two waggons were completely broken up, and 14 others damaged considerably.

The permanent-way was a good deal cut up, but no rails were broken.

On the main line 20 fish-bolts, 50 chairs, and 12 sleepers, and on the colliery siding 12 fish bolts, 36 chairs, and 24 sleepers were broken.

On the engine the two sand-pipes and guard-iron, two side chains, and draw-bar between engine and tender, were broken, and the flanges of the wheels slightly damaged; the spokes of the left trailing wheel (or right leading wheel as it was running) being bent and chipped, and the under frame of the engine on the same side dented.

Description.

On approaching Stairfoot junction from the west the Manchester, Sheffield, and Lincolnshire up main line runs for a considerable distance down an incline of 1 in 80, which gradient changes, at about 80 yards east of the junction, to 1 in 155½, continuing thus through the station. At the junction a colliery line from the north-west joins the main line, the trailing points being on the up line. The down platform at Stairfoot station commences at about 88 yards east of the junction, and the up platform about 60 yards further east, both platforms being about 100 yards in length. West of the station there is a cross-over road, and a through road into some colliery sidings on the up side of the line, the trailing points of which on the up line are nearly opposite to the west end of the down platform. The spot where there is the first mark of the engine leaving the rails is a little east of these points, and 115 yards east of Stairfoot junction, the line here being on a very easy curve to the south, and on a falling gradient of 1 in 155½.

There is also a cross-over road and through road into these colliery sidings at the east end of the station, the crossing on the up line where the engine was divided from the tender, and diverted into the sidings, being 140 yards east of the point where it first left the rails.

The permanent-way consists of 80lb. steel rails, in 24-foot lengths, fixed in 39½lb. chairs, and fished at the joints with fish-plates weighing 14 lbs. each, and fish-bolts 1½ lbs. each. The sleepers are Baltic redwood timber, and there are nine sleepers to each 24-foot length of rail. The chairs are secured to the sleepers by three spikes to each chair.

The engine (No. 108) is a six-wheel coupled goods engine, with a six-wheeled tender, having one break block to each wheel.

The following is the evidence given by servants of the Company :—

Evidence.

Henry Shepherd, goods driver three years, states : On the 4th September I was driver of the up night goods train from Pennistone to Wombwell. We left Pennistone at 7. p.m., about 15 minutes late. We stopped at Barnsley at about 7.30 p.m. for about 15 minutes. We left Barnsley at 7.50, still about 15 minutes late, and found the signals all right the whole way. We passed Stairfoot junction, where the signals were right for running through Stairfoot station. I was running tender first, and the first thing I noticed wrong was that the engine had left the road with one or more wheels. This was after we had passed over the points of the cross-over road. We ran through the station with the tender still on the rails, and some of the engine wheels off the rails, running over the tops of the chairs. I think it was the leading wheels, as we were then running, which were off. When we got to the wing rail of the crossing, leading from the down line into the Oaks colliery siding, the engine broke away from the tender. The tender ran along the main line, the engine followed the colliery siding, one truck followed the track of the engine, and the others ran off the line on both sides. The draw-bar was broken and the two side chains. I got on to the tender, but my mate was thrown off as the tender parted from the engine and fell on the four-foot. He was run over and killed. He was just breathing when picked up, but that was all. When the engine first left the rails we were running about 20 miles an hour, my steam being off at the time. I whistled for the guard's breaks, and my mate tightened up the tender break, which had been slightly on all down the bank. The tender was stopped by the break about 80 yards beyond the crossing, being still on the main line. I came back, and after looking after my mate I went to the engine and got the fire out. I went and looked at the road when it came daylight, but I could find nothing whatever to account for the engine leaving the rails. I know the road well, and it had been running well. My engine (108) is a six-wheel coupled goods engine, with a six-wheeled tender, with tender break and one block to each wheel. I did not find any impediment on the road, nor did I miss any bar off my engine. The engine had only been running about five weeks since it had been thoroughly repaired in the shops. It had been running well since. I cannot account at all for leaving the rails.

William Stead, goods guard 13 years, states : On the 4th September I was guard of the up night goods from Pennistone to Wombwell, consisting of engine and tender, 30 empty waggons, and one break-van in rear, in which I was riding. We took on 10 more empties at Barnsley. We left Pennistone at 6.50, 30 minutes late; arrived at Barnsley at 7.30, 50 minutes late; left Barnsley 7.50, 50 minutes late. We passed Stairfoot junction box at 8.2. I had put my break on about a mile before this to steady the train down the incline. We were running steadily and at about our usual speed. Just about the time my van was passing the box, I heard the driver sound his break whistle, but I could do nothing more, as my break was hard on. I was looking out of the side of my van, and I saw the fire flying from the rails, probably from the tender breaks being put on hard. I thought I felt a slight shock, which must have been at about the time when the engine got to the colliery crossing; this was followed by a more violent shock,

and I then thought something serious must be wrong, and jumped out of my van. I ran forward, and had got about 10 waggons lengths when I found the fireman lying dead on the road. I saw that both lines were fouled, and ran back and told the signalman to block both lines. The break-van and the 26 rear trucks were all on the rails at a standstill, the deceased being under the tenth waggon from the rear. The other 14 waggons were thrown in all directions, both on the colliery siding and across both main lines. The tender was still on the rails of the up main line about 40 yards beyond the engine, which was on the colliery siding with all its wheels off the rails. I went and examined the road, and could find nothing whatever wrong with it, nor anything to account for the accident. I had been over the road the day previous, and it had not been running at all rough. The driver was perfectly sober.

Thomas Hitchbun, signalman two years, 12 months of which at Stairfoot junction, states : I saw the goods train pass at 8.2 p.m., and observed nothing unusual, it running steadily at its usual speed. The last thing which had passed on the up line before the goods train was a light engine (No. 49) at 6.54 p.m. It was then dusk, but I could see well enough. There was nothing left on the line after it had passed.

Mr. William Jenders, principal permanent-way inspector, states : I am in charge of this portion of the line, and was on the spot at 8.30 a.m. of the 5th instant, after the accident. I made a thorough examination of the road, and found it in perfect condition up to the point where there was the first trace of the engine having left the rails. This was at about five yards beyond the cross-over road points on the up line. There was a clear mark where a right wheel had dropped off the rail, and where the flange of a left wheel had run over the left-hand rail. From this point up to the crossing of the connection of the colliery siding with the down line there were marks of an engine wheel flange running along the chair tops on the left-hand side of both rails throughout the whole distance, some of the chairs being broken. At the first wing rail of the crossing the right wheel had mounted, run along the top for about three feet, and then dropped off on to the sleepers between the wing rail and the right-hand running rail. The whole crossing was knocked about, but there were clear marks where the engine had run up the side, and where it had been twisted off the main line on to the siding. I was on the spot the day before, and the road was in good order. The gauge was perfectly right up to the crossing when I tried it the day after the accident.

George Platts, permanent-way inspector, states : I examined the road the same night about an hour after the accident. It was then quite right up to the point where the engine left the rails. There was no impediment on the line.

Mr. Robert Dallas, engineer's department, states : I was sent by Mr. Sacré the day after the accident to make a thorough examination of the road, more especially with reference to the levels of the line, on account of the colliery workings sometimes causing sinkings. I levelled for about 600 yards and found the gradient very even.

Conclusion.

From the foregoing evidence, and an examination of the site of the accident, it appears that the two leading wheels of the engine, as it was then running, left the rails

at a point about five yards beyond the trailing points of the cross-over road, and about 115 yards east of Stairfoot junction.

No other wheels of the engine or tender seem to have left the rails at this point, but the engine ran with these two wheels only off on the left side, and keeping close to the rails, along the chair tops for a distance of 140 yards through Stairfoot station, until it arrived at the crossing of the connection of some colliery sidings on the up side of the line with the down main line. Here the right wheel mounted the first wing rail, ran along the top for about three feet, and then dropped off between the wing rail and the right running rail. It then knocked away the points of a slip-road on to the up main line, and was twisted off on to the siding, up which it ran for about 40 yards, coming to a stand with all its wheels off the rails.

The tender, which was in front of the engine, never left the rails at all, but the couplings between it and the engine were broken, and the flap-plate torn off when the latter ran up the siding, and the unfortunate fireman, who was standing on the flap-plate, was here thrown off and killed, the tender eventually coming to a standstill on the main line about 80 yards beyond the crossing.

One of the goods waggons followed the engine up the siding, and the 13 succeeding ones were thrown off the rails in all directions, blocking both lines.

I could see nothing wrong with the permanent-way, and all the evidence is to the effect that it was in good order before the accident, while there is no reason to believe that the speed was excessive, for both the evidence of the servants of the Company and a comparison of the times at which the train was recorded as passing the preceding signal cabins show that, although it was late, it was not making up any time, and was running at its usual speed.

I made an examination of the engine, which has been kept at Mexboro' in the same condition as it was found after the accident.

The springs were unbroken, the gauge correct, and the flanges of the wheels in good order, but the left trailing wheel (or right leading wheel as it was then running), which was apparently one of those which first left the rails, showed marks of considerable importance.

Three of the spokes were bent and had on them indentations $\frac{1}{4}$ of an inch in depth and some inches in extent, and seven other spokes were chipped and marked in a somewhat less degree. The under edge of the engine frame on the same side above the wheel had an indentation of considerable depth, and there were similar marks on the inside of the splasher at its connection with the foot-plate.

It is clear from these marks that a large piece of iron had been caught up in the spokes of the wheel and carried round until it was jammed against the under frame, bending and chipping the spokes as they struck against it. It is possible that this piece of iron may have been a broken chair caught up after the engine had left the rails, and that these marks show the effect and not the cause of the accident; but as there is no other possible explanation for the engine leaving the rails, I can only conclude that there must have been some impediment on the line, which was perhaps thrown across the rail by the tender wheels, and which, being caught up by the leading engine wheel in the manner described, caused a sudden wrench, which threw the wheel off the rail.

The weights on the engine wheels after the accident were as follows:—

		Tons.	cwts.
Leading wheels	-	10	0
Driving „	-	12	13
Trailing „	-	8	12
		<u>31</u>	<u>5</u>

but unfortunately there were no means available to get the weight of all the wheels separately. No doubt the fact of the weight on the then leading wheels being less than that on the others, and the whole weight of the train being on the engine buffers, would tend to make it easier for a sudden check to throw the engine off:

I have, &c.,

The Secretary,
(Railway Department,) Board of Trade.

F. A. MARINDIN,
Major R.E.

Printed copies of the above report were sent to the Company on the 5th October.

METROPOLITAN DISTRICT RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, 10th September 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 28th ultimo, the result of my inquiry into the circumstances attending an accident which occurred, on the 23rd ultimo, at Gloucester Road station on the Metropolitan District Railway, to a passenger train belonging to the London and North-Western Railway Company.

In this case, as the 9.10 a.m. train from Broad Street to Mansion House, was stopping at Gloucester Road station, at 10.3 a.m., it divided into two parts, the engine and front carriage, a third-class carriage with break compartment, running some 50 yards ahead, and the remainder of the train pulling up at the platform.

The draw-bar of the front carriage was broken, and the rear head-stock and the panels at the rear end of the carriage were torn off, but there was no other damage to the rolling stock.

One woman, who jumped out of the damaged carriage while it was still in motion, complained of being slightly injured.

The train was made up as follows:—Tank-engine, running chimney first, third-class carriage with empty break compartment at leading end, second-class carriage, composite carriage, first-class carriage, composite carriage, and third-class carriage with break compartment at trailing end, in which the guard was riding. The whole of the vehicles were fitted with Clark and Webb's chain-break, in two sections of three vehicles each, the leading section being controlled from the engine, and the rear section from the guard's break compartment.

The engine was a four-wheel-coupled tank-engine, with four-wheel bogie, and was fitted with a steam break to break the four driving wheels, with one block to each wheel. This break could also be applied by hand, and the driver could apply the chain break to the three leading vehicles by means of a cord.

The carriages were close coupled, and had two side chains attached.

Description.

Gloucester Road is a joint station of the Metropolitan and Metropolitan District Railway Companies.

The Metropolitan line from Kensington High Street and the Metropolitan District line from Earl's Court here converge, and run alongside each other, from west to east, through this station, towards South Kensington station, where they form a junction.

There is an island platform between the two lines, and a platform on the outside of each of them. These platforms are 360 feet in length.

The accident took place on the up Metropolitan District line from Earl's Court to Mansion House, which runs along the south side of the island platform.

There is a short tunnel at each end of the station, and a cross-over road between the up and down lines, the trailing points of which on the up District line are 225 feet from the west end of the platform.

The following is the evidence given by servants of the Companies concerned:—

Evidence.

Robert Walker, station inspector, in joint service of Metropolitan and Metropolitan District Railway Companies, states:—I am in charge of Gloucester Road Station. On the 23rd instant I was on the platform at 10.1 a.m. The London and North-Western passenger train from Broad Street to Mansion House, due at Gloucester Road at 10.1 a.m., ran into the station at 10.3 a.m. Just as the engine had arrived at the cross-over road points, I noticed the engine and front carriage break away from the remainder of the train and run ahead into the tunnel. I was standing close by. The rear portion of the train also moved ahead about 10 or 12 yards before it stopped, which it did at the proper place. I called out to the passengers to keep the doors closed, and one of the porters went and shut three doors which had been opened. I understand that a female pas-

senger jumped out of the front carriage while it was running ahead, and was slightly hurt, but she went up the stairs to the other platform and proceeded by the next train. I got down on to the line to see if anyone had fallen out, for as the front carriage went away I saw the end of it drop off on to the line, leaving the passengers sitting in the carriage exposed to view. I then went on into the tunnel and brought back the engine and carriage, having cleared away the wreck from the line. I do not think that the train was running in faster than usual, and I do not think it would have overshot the platform if the accident had not taken place. The hind part of the front carriage was lying on the line, with one of the side chains still attached to the rear part of the train and the other broken. The draw-bar was broken, and the hind portion pulled out.

William Hunt, guard in the service of the London and North-Western Railway Company three years, states:—I have been acting as passenger-guard of the trains from Broad Street to Mansion House for three years. On the 23rd August I was guard of the 9.10 a.m. train from Broad Street, due at Gloucester Road at 10.1 a.m. Nothing unusual happened on approaching the station. I applied my break at the usual place, viz., at the west end of the short tunnel outside the station. The train was not going any faster than it always does, and I did not apply my break with any greater force than usual. The train consisted of tank-engine, third-class carriage with break compartment at leading end, second-class carriage, one composite, one first-class, one composite, and a third-class with break compartment at rear end, in which I was riding. The whole of the vehicles were fitted with Clark and Webb's chain-break, the three leading ones being controlled from the engine, and the three rear ones from my break compartment. The practice in pulling up these trains is for the guard to apply the breaks under his control, and for the driver to apply the steam-break to his engine, and the chain-break to the three leading vehicles if he thinks it necessary. The train pulled up at the usual place at the platform, and I felt nothing, and did not learn that anything was wrong until I got to the front of the train. I found that the train had divided, the engine and first carriage having run ahead into the tunnel, and the head-stock and rear of the carriage being left on the line. The draw-bar and head-stock were broken, and one side chain broke. No one complained to me of any injury, but I understand that a woman who had jumped out afterwards complained. The driver was quite sober. I saw him before starting. I shunted the whole train and transferred the passengers.

Martin Weatherburn, passenger driver in service of London and North-Western Railway Company seven years, states:—I have been driving the train from Broad Street to Mansion House for 6½ years. On the 23rd ultimo I was driving the 9.10 a.m. train from Broad Street, consisting of tank engine, running engine first, and six vehicles. My engine is a four-wheel coupled engine, with four-wheeled bogie, and it is fitted with a steam-break, which breaks the four driving wheels, with one block to each wheel. I also have control of the chain-break attached to the three leading vehicles of the train, and I can apply it by pulling a cord. I am ordered not to use this break except in cases of emergency, but I have to use my discretion as to putting on my engine-break according to the speed I am going. The guard has to apply the chain-

break to the rear portion of the train, putting it on when he thinks it necessary. I think we were a few minutes late in coming into Gloucester Road station. I was not running any faster than usual. I shut off steam at the usual place, and we ran into the station at the usual speed. I had put on my steam-break at the west end of the platform. I cannot say where the guard's break was put on. I can generally feel it put on, but I didn't feel it on this occasion. When I had got about two-thirds of the way down the station, I heard a snap, and the engine shot ahead. I looked round and saw that the front carriage, which was still attached to my engine, had broken away from the remainder of the train, which was following very slowly. As soon as I saw that the rear portion was stopping, I did what I could to stop the engine. I mean that I kept the engine-break on, and I could do nothing else, as the break was on. I didn't open the sand boxes. I ran about 50 yards.

William White, fireman in service of London and North-Western Railway Company seven or eight weeks, states:—I was fireman to Martin Weatherburn on the 23rd ultimo. On approaching Gloucester Road station the engine break was applied by hand before entering the short tunnel at the west end of the station, but was taken off when going up the platform, because we were going in too slowly. The steam break was put on for the first time after the accident had happened, in order to pull the engine up. I am quite sure of this. When I took the hand break off I didn't feel any drag on the train. I didn't feel any jerk at the time of the accident, and the first I knew of it was from shooting ahead. I felt the guards break applied at the usual place.

Martin Weatherburn, having heard the evidence of his fireman, admits that the latter's statement about the breaks is the correct account of what occurred.

Haddon Martin, carriage examiner in service of London and North-Western Railway Company at Willesden, states:—On the 23rd ultimo I proceeded to Gloucester Road station to examine the train which had divided, and found it standing in the siding in two parts. The third-class break carriage No. 408, which had been next to the engine, had the rear head-stock broken away from between the buffers, and the end of the carriage pulled out with it. I examined the draw-bar and found it broken at the screw, about 6 or 8 inches inside the head-stock, and close to the coupling boxes. The metal was good, but there was a slight flaw on one side.

Conclusion.

From the foregoing evidence it appears that as the 9.10 a.m. London and North-Western train from Broad Street to Mansion House was pulling up at the island platform at Gloucester Road station at 10.1 a.m., two minutes late, the draw-bar of the leading carriage, a third-class carriage with break compartment in front, broke under the carriage, at the screw close to the coupling boxes, about six or eight inches inside the rear head-stock of the carriage, and that one of the side chains, still holding fast, snapped the rear head-stock in two places inside the two buffers, and pulled off with it the whole of the panels of the trailing end of the carriage, which carriage, in its damaged state, ran forward with the engine some 50 yards.

The diameter of the screw part of the draw-bar is $1\frac{3}{8}$ " and $1\frac{1}{8}$ " at the bottom of the thread. It has been in use about seven years, and it was made at the Company's shops at Wolverton, of the best selected Lowmoor iron scraps. The metal appeared to be of good quality, but there was a slight flaw at one side, which, however, could not well have been detected by examination.

In spite of this flaw, it must have required a very violent jerk to snap it, and that such a violent jerk was received is evident from the after effect, when the strain came suddenly on the side chains and head-stock with sufficient force to break the latter, and also from the distance which the engine and damaged carriage shot ahead,—some 50 yards.

It seems that the practice in pulling up these trains is for the guard to apply the chain break to the rear section, which is under his control, and for the driver to use his discretion as to the application both of his engine break and also of the chain break in the section of the train under his control, it being usual to apply only the engine break sufficiently to check the speed gradually.

In this case the driver—but only after being confronted with his fireman—admitted that the engine break, having been applied in the usual place, was taken off when running up to the platform, and I have no doubt that the breaking of the draw-bar, which led to the accident, was due to the sudden acceleration of the speed of the front section of the train when the engine break was taken off, while the rear section of the train was still broken.

On this assumption, a certain amount of blame no doubt attaches to the driver of the train for not making a judicious use of the means at his disposal to check the speed of the engine and front portion of the train; but for the real cause of the accident it is not necessary to look beyond the nature of the breaks fitted to the train, and the manner in which they are applied.

Where the application of a powerful break to two different sections of a train is dependent upon the will and discretion of two different individuals, it merely requires a little extra speed, and a little more powerful application of the break than usual to the rear section only of the train, to ensure such a jerk as will probably result in the division of the train, the weakest connection being of course the one to give way; while, on the other hand, if the front be suddenly pulled up before the rear section, the discomfort to the passengers in the latter section would probably be considerable.

This accident therefore furnishes a very good example of the advantage possessed by continuous breaks, properly so called, over breaks which can only be termed sectional breaks, and shows moreover that, more especially where the nature of the traffic necessitates quick stops, as on the Metropolitan lines, the safety as well as the comfort of passengers would be increased by the adoption of such proper continuous breaks, capable of being instantaneously applied to every vehicle in the train at the will of the driver.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on the 26th September.

MIDLAND RAILWAY.

SIR,

Sandown, 13th August 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 1st ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 26th June, between a passenger train and a goods train, at Settle junction on the Midland Railway.

Six passengers and four of the Company's servants are stated to have been injured on this occasion.

The goods train engine had its trailing buffer-plate bent and broken, quarter-frame broken and part torn off; inside frame strained, and buffer-plate broken on right-hand side. The tender had its tank back forced inwards and broken, frame bent, and trailing axle broken on right-hand side, and trailing axle bent.

The passenger-train engine had its buffer-plank damaged and framing broken off between leading and driving-wheels on left-hand side. The axle-box also broken, and the leading axle bent. Tender framing on left-hand slightly bent, and one axle box broken; steps broken off.

The passenger train van had both ends broken, and one side of the body: foot-boards and one axle-box broken on left-hand side. Third-class carriage, side of body and one axle-box broken on left-hand side. Composite carriage, head-stock and side of body broken on left side.

Goods train, two fish trucks had their sides broken, and three waggon had the axle-boxes broken, and bodies slightly damaged.

The Company's new line to Carlisle leaves the line from Skipton to Lancaster and Morecambe at Settle junction, which is nearly two miles south of Settle station,

and about $1\frac{3}{4}$ miles south-east of Giggleswick station on the line to Lancaster and Morecambe.

The junction is also situated about 390 yards from the foot of a very long and almost continuous incline of 1 in 100, falling towards the south, of rather more than 14 miles in length.

It is protected by home and distant signals in the direction of Carlisle and Morecambe, the up home-signal towards Carlisle being 120 yards, and the up distant-signal 1,200 yards from the junction signal-box, placed nearly opposite to the junction : while the up-home and up-distant signals towards Giggleswick and Morecambe are respectively placed at 120 and 1,083 yards from the signal-box. The line from Giggleswick and Morecambe also falls towards the junction at an inclination of 1 in 171.

The evidence in this case is as follows :—

Edwin Allard states : I have been a signalman for two years, and have been stationed at Settle junction since January last : I was on duty when the collision occurred, and at 12.7 p.m. the “be ready” and “train approaching” signals for a through goods train were given to me from Settle station on the line to Carlisle : I refused to acknowledge those signals, until 12.18 p.m., when I carried out the instructions contained in clause 16 of the block telegraph regulations, by giving the signalman at Settle station a signal to allow the goods train to approach the junction at caution. At 12.20 p.m. I received the “be ready” and “train approaching” signals for the 11.15 a.m. up passenger train from Morecambe to Leeds, from Giggleswick station, but I refused to acknowledge those signals until 12.25 p.m., in order to allow the 11.50 a.m. down passenger train, Skipton to Carlisle, to cross the junction. At that time I acknowledged the signals for the up passenger train from Morecambe, and at 12.33 p.m. I received the “train on line” signal from Giggleswick for the same train. I then forwarded the “be ready” and “train approaching” signals for this train to the south box at Settle junction, and after the distant-signal from that post, up to which I have to work as per clause 4 of my special instructions, forwarding the signals at my post, had been taken off, I took off my distant-home, and starting signals applicable to the Morecambe passenger train, to allow it to pass. At that time the home and distant signals applicable to the up goods train from Carlisle, which was approaching the junction, were properly at “danger.” I am certain that I did not take off either my up home or up distant signals applicable to the goods train after giving it permission to approach my post at caution. The goods train appeared to approach cautiously, and I was under the impression that it would stop clear of the fouling point, but when within about 100 yards of the junction I did not think it would be able to stop. I shouted and whistled, and held up my arms to attract attention. The driver appeared to take no notice of this, and I then immediately reversed the home-signal against the up passenger train from Morecambe. The driver of the goods train, as soon as his engine had fouled the junction, whistled for the guards break, and had no sooner done so than the collision occurred, about 12.36 p.m. Just before the collision I saw one man jump off the passenger train engine, but I cannot say whether it was the driver or the fireman. The goods train was in motion when the collision occurred. I believe the steam was off, but I think the goods train was travelling about three miles an hour. The two engines came in contact : the passenger train was travelling at the usual speed. I think the passenger train might have been 150 yards outside the fouling point when I threw up the home-signal against it. The driver of the goods train gave three sharp whistles when the leading wheel of the engine had just fouled the junction. Both engines were thrown off the rails, and the break-van and two carriage trucks in the passenger train were also thrown off the rails, as well as three goods trucks.

William Ball, of Settle station, said : I have been

a signalman at Settle station since March 1877. The 8.35 a.m. up goods train, Carlisle to Skipton, on the 26th instant, was signalled to me from Stainforth as follows : “Be ready” and “train approaching.” 12.1 ; train on line, 12.6. That goods train is booked to stop at the sidings at Settle junction, and due to arrive there at 12.40 p.m., at which time I sent the “be ready” and “train approaching” signals to Settle junction, but the signalman there refused to acknowledge them. The train arrived at my post at 12.10 and stopped, and at 12.18 p.m. I received signal from Settle junction to send it on under clause 16 of the block regulations. It was due to leave at 12.34 p.m. I instructed the driver and guard to proceed at caution, and the train left at 12.30 p.m. Both the driver and guard appeared to thoroughly understand the instructions. I gave to them as to being sent on at caution. I spoke to the driver on the subject : he appeared to be steady. I did not get “line clear” back for that train from Settle junction.

Samuel Trow, engine-driver about three years, and driver of the 8.35 a.m. up goods train from Carlisle to Skipton on June 26, states : I stopped at Settle station for water, and after starting from the crane, and when passing the signalman’s cabin, the signalman put his head out of the window, and said, “Caution to the junction.” I strictly carried out that order, and, on sighting the signals at the junction, they were all at danger for both roads. When very near the overbridge, and my train was almost at a dead stand, I saw that the arm of the left-hand semaphore-signal was lowered. I turned to my fireman, and then quickly turned to look at the signals again, and, after looking twice at them, I noticed that the left-hand semaphore was still off. I turned to my fireman again, and said, “Right, Tom, let her come, the passenger must have gone.” My fireman released his break, and after running a few yards, I applied a little steam. I then saw a man on the line waving his hands for me to stop. On looking round to ascertain the cause, I saw some men in the signal-cabin also waving their hands for me to stop, and a man running down the cabin steps. The first thing I then saw was the arm of the right-hand semaphore off, and the passenger train perhaps midway between the distant and home signals. I did all I possibly could to attract the attention of the driver of the passenger train, but he paid attention to the signal which was off for him, and I know the signal was allowed to remain off for him to proceed whilst I stood foul of the junction. Just before the collision, my fireman said twice, “I am sure it was our signal that was off,” and he asked, “What shall we do?” I said, “Jump for your life,” and he jumped. I then saw that the passenger train engine was only a few yards from us, and I went to the fireman’s side of the engine for the purpose of jumping myself. I do not know whether I did jump, as the next thing I remember was finding myself on the embankment. I am not certain as to the time when I left the Settle station, and I don’t know whether it was before or after the appointed time. I am not able to say whether my train was still in motion when the collision took place, and I don’t know when it occurred.

Henry Drage said : I am a goods guard stationed at Carlisle. I have been a goods guard 6 years, and have been at Carlisle nearly 3 years. I was in charge of the 8.35 a.m. up goods train, Carlisle to Skipton, on the 26th June. My train consisted of a tender-engine, 14 waggons of minerals, 8 of goods, and 8 empties. We left Settle station at 12.28, 6 minutes before time, being due to leave there at 12.34 p.m. This time, however, was gained by the driver not stopping at Kirby Stephen for water as booked. We took water at Settle, and, on starting from Settle, the signalman advised me that we were to go at caution. I did not hear him tell the driver. I then applied my brake immediately after passing the Settle station signal-box, and kept it on ; and when I saw the signals worked from Settle junction applicable to the line we were running upon were at "danger," I tightened the brake and put it on as hard as I could, and remained in that position until we passed them. When the engine of my train was about 60 or 70 yards from the junction home-signals, I saw the passenger train from Morecambe approaching about halfway between Giggleswick station and Settle junction up distant-signal, towards Giggleswick. At that time I noticed the distant and home signals applicable to the passenger train were both taken off. We were then going very slowly, but almost immediately the home-signal was lowered for the passenger train to pass, my train increased speed. I then applied the brake tighter, and also let out sand from the sand-box on to the rails. Neither of the drivers whistled, and the engine of my train ran foul of the junction, and was run into by the passenger train. I never heard any whistle from the driver of my train. I am quite positive that neither the home nor the distant signal, applicable to the driver of my train, was taken off. My train was nearly at a standstill when the collision occurred. The driver had reversed his engine. This was about 12.36 p.m. My train was booked to stop at the Settle junction siding.

Thomas Beale said : I am a fireman stationed at Carlisle, and have been in that capacity for 6 years. I was firing for driver Samuel Trow, engine No. 1,183, working the 8.35 a.m. up goods train from Carlisle to Skipton, June 26th. After taking water at Settle station, and the train had been examined by the waggon examiners, the starting-signal was taken off for us to proceed. The signalman verbally instructed the driver and myself to proceed at "caution" to Settle junction. The advanced starting-signal was then taken off, and we let the train run steadily on, and between Settle station and the junction I do not think a higher speed than seven or eight miles per hour was attained, the train being kept well under control. On approaching Settle junction, all the upline signals, both for the line upon which we were running, and for the line from Morecambe, were at "danger." When about 200 yards from the overbridge, the driver said, "Right, mate ; the passenger train must have gone." I then released the tender brake, and, whilst doing so, saw one of the junction home-signals—I can't say whether it was the right or the left, I did not see two signals—was off. Both the home-signals are placed side by side, but I only saw the one that was off, which I feel certain was the one applicable to our line. I was standing on the left side of the engine. I saw it between the chimney and the dome of the engine. I cannot swear that such was the case, as the view of one of the signals would doubtless be intercepted by the chimney or dome of the engine, and seeing one off, and my mate having said "Right, let her come," I came to the conclusion that it must be our signal. When passing under the overbridge which is close to the junction, my mate said something, but what I cannot say. He reversed his engine, and I applied the tender-brake. Immediately after, Trow said, "Jump, mate, for your life." I then went to the right-hand side of the engine, and saw the passenger train approaching. We were close upon the fouling point, and I jumped off the left-hand

side, my mate following. I had no sooner done so than the collision occurred, the tender of our engine being turned over at the place where I fell, and I narrowly escaped being crushed by it. A quantity of coal was thrown on to my back out of the tender, but I was not injured by it. We were nearly at a standstill when the collision occurred. I don't remember whether the driver whistled for the breaks or not. The engine was considerably damaged, knocked off the road all six wheels, the tender turned over on its side, and three of the waggons on the train knocked off the rails, and more or less damaged. After the collision my mate and I rose up, he remarking that he felt very faint. He managed to walk about for nearly half an hour, but was afterwards taken ill, being seized with convulsions, and the medical staff who were present had to attend to him. I extinguished the fires of both engines, and rendered what assistance I could.

Driver W. Jarvis, who was working the 11.15 a.m. up train from Morecambe, said : that after leaving Giggleswick station I noticed the distant-signal applicable to the line upon which I was running, and the home-signals applicable to both lines, at "danger" at Settle junction. When about 400 or 500 yards from the distant-signal towards Giggleswick, it, as well as the home-signal for that line, were taken off. I noticed the goods train approaching the junction, and thought, from the speed it was running, that it would be able to pull up before reaching the fouling point: the home-signal applicable to the line from Morecambe was reversed and placed at "danger" when it was about 40 or 50 yards from it. I shut off steam, so as to reduce speed in order to pass over the junction at the maximum rate of 20 miles per hour. Immediately after the signal was reversed, I perceived that the driver of the goods train would not be able to stop clear, and I then reversed my engine, and my fireman, Harling, applied the tender brake, which was all we could do to mitigate the effects of the collision which was then inevitable, and I and my fireman jumped off the engine, and both received injuries in doing so: I was badly bruised all over my body and face, and I had a bad scalp wound, and was severely injured in the back: I never saw the up junction-signal for the goods train taken off as I was approaching the junction after I came in sight: I could see it about 700 yards before I got to the distant-signal; it might be a little more: I was running about 20 miles an hour when the collision took place, at about 12.36 p.m.

Fireman W. Harlings, of Lancaster, says: The distant-signal towards Giggleswick was taken off when we were about 300 or 400 yards from it, and the home-signal was also off: I did not see the up home-signal at Settle junction taken off for the up goods train from Carlisle: I saw the home-signal off for my line before I arrived at the distant-signal, and the one applicable to the line from Carlisle was at "danger," but I took no further notice of them, but watched the goods train approaching the junction, which was travelling slowly, and which I thought would pull up clear of the junction, but when getting close upon the junction I remarked to Jarvis that it was running foul: I then applied the tender brake, but did not get it tight on before he jumped off, and Jarvis reversed the engine: I was more or less shaken and bruised, and received a scalp wound.

Charles Walmsley said : I am a passenger guard stationed at Lancaster, and have been a head guard for the last six months: I was in charge of the 11.15 a.m. passenger train, Morecambe to Leeds, on the 26th instant, and was riding in the middle break: my train consisted of 10 vehicles, marshalled as follows: Leading break, two carriage trucks laden with perishable traffic, one third-class carriage, two composites, one third-class, one van in which I rode,

one composite, and one van. The train ran punctually up to Wennington, from which station we were one minute late, and we ran forward to Giggleswick one minute late: another minute was however lost by the engine-driver taking water at Giggleswick, which caused us to be two minutes late: we left at 12.33 p.m. After passing Giggleswick station about 400 yards, I noticed that the Settle junction home and distant signals were off for my driver, and also that the up home-signal applicable to the Carlisle line was at "danger". I did not hear the driver whistle for the breaks, and knew nothing more until the collision occurred, the force of which knocked me down on the floor of the van, but I was not injured. The collision occurred at 12.36 p.m. I did not notice the goods train approach the junction from the Carlisle line, as I was not looking out of that side of the break. We were running at our usual speed when the collision took place. The collision stopped my watch at 12.36.

From the preceding statements it appears that an up through goods train was permitted to leave Settle station for Settle junction, distant nearly two miles apart, about 12.30 p.m., with the concurrence of the signalmen at these two block telegraph stations, and, in accordance with the Company's regulations, the driver and guard being both told by the signalman at Settle station to proceed with caution. This goods-train was appointed to stop at the sidings at Settle junction, and was due there at 12.40 p.m.

The regulations under which this collision occurred are as follows: No. 16 of the regulations for train signalling by block telegraph system says, "When it is found necessary for a train to be allowed to approach a block post cautiously in consequence of the failure of an engine near such post, or the failure of the block apparatus of the advance section, or from any other cause, when the '*be ready*' and '*train approaching*' signals are received, such signals must not be acknowledged, but eight beats of the needle must be given to the left-hand, and when this signal has been acknowledged, the needle must be pegged over to '*line blocked*.' The signalman at the post in the rear, on receiving such signal, must stop the approaching train, and verbally instruct the driver to proceed cautiously towards the post from which the signal was received."

In addition to the preceding regulation, which appears to apply to all block telegraph stations, the following special instructions have been issued for the guidance of the signalman at Settle junction:

MIDLAND RAILWAY.

Instructions to be observed by the signalman on duty at Settle junction.

1. Permission must not be given on the block telegraph for a train or engine to approach from Settle new station when any obstruction exists at or near your post on the line on which the train or engine is about to run, except in accordance with clause 16 of the regulations for working the block telegraph; and after permission has been given for a train or engine to approach from Settle new station, no obstruction of the line on which such train or engine is about to run must be allowed until the train or engine has passed, or been brought to a stand, or the signal has been withdrawn by the signalman in the rear.

2. When a passenger-train is standing on the up main-line at or near your post, permission must not be given on the block telegraph for any train or engine to approach on the line on which such passenger-train is standing, except in accordance with clause 16 of the regulations for working the block telegraph; and after permission has been given for an up train or engine to approach, no passenger-train must be allowed to foul the line on which the train or engine is about to run until such train or engine has passed, or been brought to a stand, or the signal has been withdrawn by the signalman in the rear.

3. Permission must not be given on the block

George Sharpe said: I am a passenger guard stationed at Leeds, and was acting as head guard with the 11.15 a.m. passenger train, Morecambe to Leeds, on the 26th June. I was riding in the rear van. When about 100 yards from the up distant-signal worked from Settle junction I noticed it was off, but I did not notice the home-signal. On getting closer to the junction I observed a goods-train approaching it from the Carlisle line very slowly, perhaps three or four miles per hour. I was under the impression that the driver of it would not be able to stop clear of the junction: I therefore immediately went to my break, and was in the act of applying it when the collision occurred. We were running a little slower than our usual rate. I heard no whistle from our driver, and I was not hurt. The steam on our engine had been shut off, but I cannot say when it was shut off.

telegraph for a train to approach your post from Settle new station and one from Settle old station at the same time, when either or both are passenger trains, except in accordance with clause 16 of the regulations for working the block telegraph.

4. When the distant-signal fixed near your post, and worked from the south end of the sidings, is at danger, the danger-signal must also be exhibited at your home, distant, and starting-signals applicable to trains and engines going towards the south end of the sidings; and no train or engine must be allowed to pass your post on the up main-line without having previously been brought nearly to a stand outside the home-signal. When this has been done, and the necessary signals have been obtained on the block telegraph for the train or engine to proceed, the up line distant-signals must remain at danger for the protection of the train or engine, and the proper home and starting-signals be lowered to give permission for it to proceed. Should a train or engine have been brought nearly to a stand outside the home-signal in consequence of the distant-signal fixed near your post, and worked from the south end of the sidings, being at danger, before the necessary signals have been obtained on the block telegraph for it to proceed, the home-signal must be lowered to allow the train or engine to draw forward to the starting-signal.

JAMES ALLPORT,
General Manager.

Derby, September 1876.

At 12.33 p.m. the signalman at the junction received the signal "Train on line" from Giggleswick station for the 11.15 a.m. train from Morecambe to Leeds, which

consisted of an engine and tender and 10 vehicles, including two vans with two guards, and the signalman says that after the distant-signal, worked from the Settle junction south signal-box, had been taken off, he then took off the up distant, up home, and up starting signals to allow the passenger train from Morecambe to proceed, at which time the up home and up distant signals, applicable to the up goods train from Carlisle, were properly at "danger" against it, and that he did not take off either of those signals for that goods train to pass.

There is a discrepancy in the statements with respect to the up home and up distant signals, applicable to the goods train from Carlisle, as the engine-driver of the goods train distinctly asserts that "when very near the overbridge (which is somewhere about 145 yards from the junction signal-box), and my train was almost at a dead stand, I saw that the arm of the left-hand semaphore-signal was lowered. I turned to my fireman, and then quickly turned to look at the signals again, and, after looking twice at them, I noticed that the left-hand semaphore was still off. I turned to my fireman again, and said, 'Right, Tom, let her come, the passenger must have gone.' My fireman released his break, and, after running a few yards, I applied a little steam. I then saw a man on the line waving his hands for me to stop. On looking round to ascertain the cause, I saw some men in the signal-cabin also waving their hands for me to stop, and a man running down the cabin steps. The first thing I then saw was the arm of the right-hand semaphore off, and the passenger train perhaps midway between the distant and home signals."

With respect to this statement I must observe that it is not confirmed, as regards the particular arm that was lowered, by the testimony of any other person, and is contradicted by most of the other witnesses.

The left-hand arm of the semaphore-signal is the proper home-signal for the goods train to proceed, and the right arm is the proper signal for the up passenger train to pass on: and, from the interlocking of the points and signals in the signal-box, it is impossible that the signals for the up goods train on the Carlisle line should be off at the same time as those for the up passenger train from Morecambe were off.

Taking, therefore, into consideration the whole of the statements which bear upon this part of the subject, I have arrived at the conclusion that the driver of the up goods train was mistaken in supposing that the up home-signal at Settle junction had been taken off for him to proceed, and that the collision was entirely due to his carelessness.

At the same time it must be remarked that this goods train was permitted to leave Settle station either four or six minutes before its proper time, and the collision at Settle junction occurred at 12.36 p.m., or four minutes before the train was due there, the passenger train being two minutes late. I cannot think it is right to permit any trains to run before their appointed times.

The next point deserving of the careful consideration of the directors and officers of the Midland Railway has reference to the practice still continued on that line, of permitting trains that may possibly come into collision with each other to approach a junction at the same time, especially such a junction as that at Settle. This subject is frequently brought to the notice of the various railway companies by the inspecting officers of the Board of Trade in their reports on collisions that occur at junctions, and I am happy to say that many of the principal railway companies have altered their practice in this respect; and I trust that the example thus set will be followed on so important a line as the Midland Railway.

There is still one other subject to which I must call attention. If the passenger-train had been fitted with continuous breaks, placed under the control of the engine-driver, it is probable that this collision might have been altogether avoided or greatly mitigated in its effects.

The delay in making this report has been due to the inability of several of the Company's servants to attend, in consequence of the injuries which they received in the collision.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 28th August.

MIDLAND RAILWAY.

SIR,
 Railway Department, Board of Trade,
 13, Downing Street, London, S.W., 15th October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the order of the 30th ult., the result of my inquiry into the circumstances connected with a collision which occurred on the 25th ult. at Whitehall junction, Leeds, on the Midland Railway.

In this case, as the up Scotch express, consisting of engine and tender, two break-vans, Pullman car "Enterprise," five composite carriages, and rear break-van, which leaves Carlisle at 1 a.m., was approaching Whitehall junction on the outside up line, it came into collision, at the junction of the two up lines, with the 2.20 a.m. up goods train from Bradford to Burton, which was running in the same direction on the inside up line, at about 4.1 a.m.

No passengers or servants of the Company were injured.

In the passenger train the sides of the two leading vans and the Pullman car were damaged, but not to any great extent. In the goods train one waggon was broken to pieces, and nine others considerably damaged.

Description.

On approaching Whitehall junction from the North the Midland main line, here running from east to west, has four lines of rails, two up on the one side, and two down on the other, for a distance of about 500 yards from Wortley junction, through Holbeck station, to Whitehall junction, whence onwards there are two lines only.

The points of the junction between the two up lines at their east end are 50 yards west of Whitehall junction signal-box, and the fouling point where the collision occurred is 40 yards further from the signal-box.

Whitehall junction signal-box contains 36 levers, and it works also the junctions of the North-western line from Copley Hill, and of the Midland line into Leeds, with the Midland main line, which runs to the south through Hunslet. These junctions are a little east of the signal-box, and beyond the site of the accident.

The only signals to which it is necessary to refer are as follows:—

The Whitehall up distant signals, which are 478 yards west of the signal-box; the junction up home signals, which are two double-armed signals providing for trains from the two up lines either to Leeds or to Hunslet, the signal post for the inside up line being 146 yards, and that for outside up line 166 yards west of the signal-box, and the up distant signal from Water Lane, the next block cabin towards the south on the main line, which is a little east of Whitehall junction box.

Holbeck station is situated between Wortley junction and Whitehall junction, the platform being 375 feet in length, with the east end 220 yards from Whitehall junction signal-box.

The usual rules adopted by the Midland Railway Company for block telegraph working are in force at this junction, and there is also a special rule, which runs as follows:—

"INSTRUCTIONS to be observed by the Signaller on duty at Whitehall junction, Leeds.

"When the distant signals fixed near your post, and worked from the Leeds junction, the Water Lane junction, and the Wortley junction, are at DANGER, the DANGER signal must also be exhibited at your home and distant signals applicable to trains and engines going towards those junctions, and no train or engine must be allowed to pass your post towards any one of those junctions, without having previously been brought nearly to a stand outside the home signal. When this has been done, and the necessary signals have been obtained on the block telegraph for the train or engine to proceed, the necessary distant and home signals must remain at DANGER for the protection of the train or engine, and the proper home signal be lowered to give permission for it to proceed."

A similar rule is in force at the adjacent signal-boxes, and very generally where the distance between block stations is very short.

The gradient is level.

The following is the evidence given by servants of the Company:—

Evidence.

Robert Thomas Taylor, signalman 20 years, states:—I have been 6½ years at Whitehall junction. I came on duty at 10 p.m. on the 24th September for an eight hours tour of duty. At 3.46 a.m. on the 25th September I got the “be ready” from Wortley junction for the 2.20 a.m. up goods train from Bradford to Burton, and gave permission for it to approach. At 3.47 a.m. I got “train on line,” and it arrived at my up home-signal on the inside up line at 3.49 a.m., and stopped there. I had kept my up home and up distant signals for this line at “danger,” to stop the train for the up express to pass on the outside up line. At 3.55 a.m. I received the “be ready” for the up Scotch express, and “train on line” at 3.57 a.m. Immediately I had got the “be ready” at 3.55 a.m., I passed it on to Water Lane, and, in accordance with my instructions, waited until the Water Lane up distant-signal was taken off before I lowered my signals for the up express on the outside up line. I lowered my signals at 3.59 a.m. I then moved away to the other end of my box to look out at the Water Lane signals, and to be handy to give the train forward when it had passed. While I was there, my assistant, who was at the desk called out, “I believe that man is taking the signals,” meaning the driver of the goods train, who was standing on the inside up line at the home-signal. I went back and looked out, but being end on to the train I could not see whether he was moving until he obscured the back lights of the signal for the outside line. This was in a few seconds only. Immediately I saw what was happening I threw up the signals against the express. The goods engine ran through No. 12 points almost immediately after I had done this, and had arrived nearly opposite to my box when the express came up, and, not being able to stop, came into collision with the goods train, striking it nearly in the centre of the train, at about 4.1 a.m. I called to the driver of the goods train just before the collision occurred, and told him what was likely to take place, although at the time I thought it probable that my signals would have stopped the express. The goods train was just crawling along. I saw the express approaching, and the breaks were hard on. It was a clear but dark night. The rails must have been damp and greasy, as it had been a little foggy. The driver of the goods train seemed to be sober. There are 36 working levers in my box.

Charles Reeves, goods driver five years, states:—On the morning of the 25th September I was driving the 2.20 a.m. up goods train from Bradford to Burton. The train consisted of engine and tender, running engine first, 44 goods waggons, of which six only were loaded, and guard’s van in rear. On arrival at Holbeck station at about 3.49 a.m. my train was brought to a stand with my engine about 10 yards short of the up inside line home-signal for Hunslet. I waited there for, I should think, quite 10 minutes for the up Scotch express to pass. I then saw the up distant-signal from Water Lane junction, which is close to Whitehall junction signal-box, and is applicable to both lines, taken off, and immediately after the up home-signal for the outside line to Hunslet was also lowered. At that time I had my doubt as to which was the right signal for my line; and, previous to seeing the Water Lane distant-signal taken off, I laid hold of my hand lamp, and was preparing to go to the signalman in the box to ask him which was my signal. Just at this time the distant-signal alluded to was taken off, and also the home-signal, and I took them both for my signals. I at once put on steam. I knew at this time that the express had not passed, but thought that the signals were lowered for me to get to Hunslet sidings in front of the express. I looked back, before starting my engine, to see if anything was coming, but I could see nothing. I had

received and signed for a copy of the notice dated May 13th, 1878, with regard to these signals, and this was my fourth trip over the line since that time. Previously I had been driving between Bradford and Burton for about two years. I didn’t see the signal thrown up, as I must have been past it. The signals were quite clear. I was not going above four miles an hour when the collision occurred. I did not imagine that anything was wrong until I heard the signalman shouting to me, when I did my best to stop.

William Spencer, fireman two years, states:—I was fireman to Charles Reeves on the 25th September. I had not been over the line since the alteration of signals, and only three times before that time. I hadn’t seen any copy of the notice of alteration of signals, except one posted in the engine shed.

Samuel Hunt, passenger driver 11½ years, states:—On the morning of the 25th September I was driver of engine No. 901, working the up Scotch express from Skipton to Normanton. My engine is a 6-wheeled engine 4 wheel-coupled, with low wheels in front, and with a 6-wheeled tender, with break-blocks to each wheel. There are no breaks on the engine wheels. The train consisted of guard’s van next the engine, then a second guard’s van, and then Pullman car “Enterprise.” These three vehicles and the tender were fitted with Westinghouse break worked from the engine. Behind the Pullman car were five carriages, and guard’s van in rear. On approaching Armley station the signals were on against me, and I pulled up to a speed of about six miles an hour. When about 200 yards from the home-signal it was lowered, as was also the starting-signal. I then put on steam again, and proceeded towards Armley Bridge, where both distant and home signals were on against me. When about 200 yards or so from the home-signal, and I was running about 6 or 8 miles an hour, it was lowered for me. I then proceeded, and saw the signals at Wortley junction, and the distant from Whitehall junction, lowered almost at the same time. I saw the red light of the break of a train which was standing on the up inside line at Holbeck station. The distant-signal from Whitehall junction was all right when I passed it, but on coming in sight of the home-signal I found it at “danger.” I was then running at a speed of close on, and not exceeding, 15 miles an hour. It is the rule not to exceed 20 miles an hour through Holbeck station. I applied the Westinghouse break immediately, but I did not feel the effect of it on the train until close on the waggons. My break was applied before I arrived at the signal-post, but it did not seem to hold well, except on my tender and on the front van. On the second van and on the car “Enterprise” it did not seem to take effect. I had noticed that this was the case on stopping at Apperley station, where I had to apply sand to prevent my over-running the platform. I cannot say whether it was so at Armley. I had from 75 lbs. to 80 lbs. pressure of air at the time I applied the break. I have often noticed that some trains fitted with the same number of Westinghouse break carriages will stop in much less distance than others. The morning was damp, and the rails greasy. I didn’t consider I was making a good stop at Apperley, and don’t think I was approaching too fast. On approaching Holbeck I was keeping a good look-out for the signals, and believe I saw the home-signal as soon as it was possible for me to do so, but it seemed to me that I was close on the signal-post before I got my break to act. I didn’t whistle for the guard’s break, nor did I reverse my engine, as I did not know that anything was foul until I was close on the waggons. I couldn’t see anything wrong, and as the Water Lane distant-signal was off, I thought there was something wrong with the signal. I put on the break as hard as I could, and my mate

applied sand to the wheels. I am certain that my train was not reduced to half speed, or seven miles an hour, when the collision occurred. My mate and I remained on the engine. As the goods train was going in the same direction as we were, I felt very little shock from the collision, and I consider that there was no shock to the train. When we stopped I was near the centre of the bridge with my leading wheels off on the left, and the axle-box resting on the outside girder. There was very little damage to the train.

Edward Daibal, fireman three years, states:—I was fireman to driver Hunt on the 25th September. We were going about 15 miles an hour when I first saw the up home signal at "danger." I was on the left side, and saw it perhaps an instant before the driver did; but I had no time to say anything before he saw it.

Jesse Atfield, passenger guard five years, states:—I was in charge of the up Scotch express on the morning of the 25th of September, consisting of engine and tender, two vans, Pullman car, five composite carriages, and rear van, in which I was riding. The three leading vehicles were fitted with Westinghouse break. We left Apperley Bridge fifteen minutes late, at 3.47 a.m., on the 25th September. We slacked for signal at Armley. The Wortley junction signals and the distant from Whitehall junction were right. I heard no whistle for my breaks, and I didn't know that anything was wrong until just as my van was passing the Whitehall junction up home signal, when I felt the shock of the collision. It was not very violent; we were not going more than 12 or 15 miles an hour at the time. I had felt a slight slackening of the speed just when my van was passing the down end of Holbeck platform, but not very great. We were not going faster than usual past Holbeck station. On getting out I saw that we had run into a goods train, which had been going in the same direction as we were. I went back to protect my train, and warned the Wortley junction signalman and the

North-Eastern signalman to block both lines. I then returned to my train. The train was not very full, and none of the passengers complained to me at the time. The engine only was off the rails. The two vans and the side of the Pullman car were damaged. The driver was perfectly sober.

James Weston, North British passenger guard 7½ years, states:—I was riding in the second van from the engine on the morning of the 25th inst. The front van was empty. I saw that the up distant signal from Whitehall junction was off when we passed it, but I didn't notice the up home signal. We were running about 20 miles an hour through Holbeck station. I didn't know that any thing was wrong until the collision occurred. There was no whistling. The shock was very slight; I hardly felt it. I felt no sudden slackening of speed before the collision. I felt the breaks go on when my van was about opposite to the south end of Holbeck platform, but I thought it was only the ordinary slackening of speed for Whitehall junction. I should think the speed when the collision occurred must have been about 12 miles an hour. The driver was quite sober. The collision occurred at about 4 a.m.

John James Hanbury, locomotive foreman at Leeds, states:—I was on the site of the collision at about 5 a.m. on the 25th September. The engine was off to the left with leading wheels and driving wheels, with the axle-box of the left leading wheel on the north end of the girder of the overbridge. The tender and all the passenger carriages were on the rails, and there were no couplings broken. Two of the waggons of the goods train were off on the right between the bridge and the junction points. Just in front of the engine one empty wagon was on its side, resting on the top of the girder, and a second empty wagon was hanging from this one by the coupling, suspended over the road below. Another was lying below in the road, broken very much. There were also five empty waggons off to the right, fouling both lines of rail.

Conclusion.

From the foregoing evidence it appears that this fortunately slight collision was due to a stupid mistake of the driver of the 2.20 a.m. up goods train from Bradford to Burton, who, while standing on the inside up main line short of the Whitehall junction up home signal post, mistook the signal which was lowered for the up Scotch express on the outside up main line for the signal applying to the line upon which he was standing, and consequently started his train and fouled the junction just as the Scotch express was approaching. He acknowledges his mistake, and admits that the signals are so placed that there should be no risk of the one being mistaken for the other.

The driver of the Scotch express also is not free from blame, for he admits that when he came in sight of the up home signal applying to the line upon which he was running, it was at "danger," having been thrown up by the signalman at Whitehall junction, on perceiving the mistake of the goods driver, and yet that he did not sound his whistle for the guard's breaks, or reverse his engine, because he thought, seeing the Water Lane up distant signal was off, that there must be something wrong with the Whitehall junction up home signal to cause it to be at "danger."

He had no business to pay any attention whatever to the Water Lane distant signal until he had passed the junction signal; and his plain duty, under all existing rules, was to use all the means in his power to bring his train to a stand the moment he saw the junction up home signal against him. Had he done so he might have reduced the speed of his train very considerably, even if he had not been able to stop altogether in time to avoid the collision.

It should be remarked here that the distance at which the Whitehall junction up home signals for the outside line are visible from an approaching train is quite insufficient, being only 75 yards.

There is some difficulty in placing these signals so as to be well seen, owing to some station buildings on an overbridge carrying the Great Northern line over the Midland

line at Holbreck. But, even if the short distance between this bridge and Wortley junction will not admit of the signals being moved to the other side of the bridge, which would be the best place for them, the view of them would be much improved if the post were moved from its present position between the two up lines to the outside of the outside up line, and if a bracket signal were substituted for the existing double-armed post.

The additional up and down lines between Wortley junction and Whitehall junction, and the consequent alterations in the signalling arrangements, have been in use since May 1878, but they have not yet been submitted for inspection in the usual manner, owing, I am informed, to some further additions being contemplated, and the work not yet being considered complete.

In similar cases it has been customary to obtain the sanction of the Board of Trade before bringing such new works into use, and it is most desirable that this custom should not be departed from.

There is another point in connection with this accident, to which attention should be called.

The speed at which the express was running when the driver first saw the signal against him has been estimated at from 15 to 20 miles an hour; and it would seem that the former estimate is the nearer of the two. The distance available for the stop from this point was 151 yards; the total weight of the train was 146 tons; and of this 58½ tons, or 40 per cent., was broken with Westinghouse breaks. Under these conditions it appeared to me that, allowing for some delay on the part of the driver in applying his break, and for the state of the rails, the speed of the train ought to have been reduced considerably more than appears to have been the case, judging from the evidence, and from the effects of the collision. On this account, therefore, and because of the statement of the driver that he thought his breaks did not act properly, I had the break gear on these vehicles thoroughly examined, and with the following results, as reported to me by the officials of the Midland Railway Company who made the examination.

It was found that the breaks upon break-van No. 177, and upon Pullman car "Enterprise," would not act at all, as no air passed into the break cylinders; and upon further investigation it was found that this was due to the triple valves in both cases being so clogged with oil and grit that they would not work. The remainder of the break gear was stated to be in good order, with the exception of the leakage valves, which did not close properly.

This would seem to point to the necessity of a periodical examination of these triple valves, especially as it does not appear that their failure to act necessarily leads, in all cases, to the application of the breaks, and consequent detection of the defect in the break apparatus, by its automatic action.

It should be added that the triple valves fitted to the vehicles in question are not those of the most recent pattern, which have an arrangement to prevent them from becoming clogged up in precisely the same manner as in this case.

I have, &c.

The Secretary,
Railway Department, Board of Trade.

F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on the 25th November.

NORTH BRITISH RAILWAY.

SIR,

Carlisle, July 12th, 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 5th instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 2nd instant, at Drumburgh station, on the Carlisle and Silloth section of the North British Railway.

In this case, while a return excursion train from Silloth to Carlisle, due to leave Silloth at 7.3 p.m., and Drumburgh at 7.33 p.m., was stopping at Drumburgh station for the collection of tickets, it was run into by another return excursion train due to leave Silloth at 7.30 p.m., and Drumburgh at 7.55 p.m.

Forty-six passengers are stated to have been injured, but some of these are believed to have received their injuries in jumping from the first excursion train some time

after the collision, in consequence of a drunken man having falsely raised an alarm that another collision was about to occur.

In only two cases—in one of which a collar bone, and in the other several ribs were broken—are the injuries stated to be of a serious character.

The damage to rolling stock was very slight, and was confined to the rear van and three rear carriages of the first train.

Description.

At Drumburgh station, the line to Port Carlisle leaves the line from Carlisle to Silloth. Both lines are single; and at Drumburgh there is a long loop and an island platform between the up and down lines. These lines are not, however, used as proper up and down lines unless a crossing of trains is taking place; otherwise both up and down trains between Carlisle and Silloth use the up line,—that to Silloth,—and it was on the up line that the collision occurred. The rear van of the first train was standing at the time 160 yards inside the loop facing-points next Silloth, and was, in consequence of the length of the train, considerably beyond the Silloth end of the platform.

The signal arrangements at Drumburgh are of the most primitive description. There is no interlocking whatever of points and signals, and the only protection to this junction station consists of three disc distant-signals, one in each direction; that towards Silloth being 407 yards from the loop facing-points, or 567 yards from the van of the first train. This distant-signal can be seen a long way off in clear weather. The van of the first train could be seen from an approaching engine for a distance of about 490 yards.

The line falls from Silloth on a gradient of 1 in 316 as far as the loop points, and is then level through the station.

The single line is worked with the train staff and ticket, except between Abbey and Kirkbride junctions, where the block telegraph is used.

Drumburgh is 12 miles 75 chains from Silloth, and 9 miles 36 chains from Carlisle.

Evidence.

1. *William Foster*, station-master at Drumburgh 14 years.—I have a boy to assist me to work the telegraph and collect tickets. The line is worked with the train staff and ticket. Drumburgh is a staff station. I was in charge of the station on the evening of the 2nd instant. I remember the first excursion train from Silloth arriving on the up line at about 7.36. It stopped to collect tickets, the engine standing beyond the Carlisle end of the platform. I, the boy, the guard of the train, and an inspector accompanying the train, collected the tickets. This had just been completed, and the train was just being started after a delay of 10 to 15 minutes, when the second train ran into it. I was collecting tickets at the front of the train, and I was not aware of the second train coming in too fast till it struck. The first train had moved forward two or three carriage lengths before the second struck it. I was standing about the centre of the train when the collision occurred. The carriages seemed to spring forward. As soon as the first train had passed the distant-signal, when approaching the station I turned this signal to danger, and I saw that it went properly to danger, viz., to the position which it always seems to occupy when put to danger. (N.B.—A curve in the line makes this position of the disc-signal appear as if it were not fully at danger as seen from the station.) The evening was quite light at this time. I heard the break whistle given by the driver of the second train when he must have been inside the loop-points. I should have heard it had he whistled previously. The guard and inspector both signalled the driver of the first train to draw ahead. The passengers were all in the first train when the collision occurred. The driver of the second train told me, in the presence of the inspector, that he had not noticed that the signal was on, and he said (looking from where we were standing), it was hanging between half on and half off. I

asked the inspector to take notice of it. He went direct to it, and came back and said it was standing at danger. The driver was agitated, but I have no reason to think he was the worse for liquor. When no trains cross at Drumburgh, up and down trains both use the up line, but when they cross they use the proper lines. The facing-points are kept locked, and they were locked on this occasion. There was no train or engine or other vehicle using the down line at this time. The first train had already received a ticket, and the second train, but for the collision, would have proceeded with the staff; but as it was, it proceeded with a ticket at about 8.50. About half an hour after the collision, two carriages in the first train, which had been uncoupled by the shock, were being pushed forward by the engine of the second train to rejoin the first train, when a drunken man on the platform called out that there was another train approaching, which made the passengers in the first train jump out, and a great many injuries were then received.

2. *Thomas Foster*, clerk at Drumburgh, son of the previous witness.—I collected tickets in the carriages next the engine of the first train. After the train had arrived I saw the station-master put the signal to danger. I saw that it went to the position it usually appears to occupy when at danger. I noticed that the first train arrived at 7.36 and was struck at 7.45. The first train was in motion when struck; it had travelled forward perhaps two carriage lengths. It was proceeding with all the passengers in it, the station business being done. I heard the break whistle given more than once before the collision. I heard the driver of the second train say to guard Moffatt that the signal had not been at danger; this was about six minutes after the collision. The driver seemed quite himself. The inspector and guard gave the driver the

signal to start. I do not know whether the tickets were all collected in the rear of the train.

3. *Thomas Simpson*, driver 12 years.—I took charge of No. 3 excursion from Carlisle to Silloth on the 2nd, and on the return journey I had charge of Nos. 3 and 4 trains combined. I was at Silloth all the time from 10 a.m. to 7.10 or 11 p.m., when we left, seven or eight minutes late. We had on 22 or 23 vehicles on the return journey, with one guard. I was not aware there was an inspector with the train. There was one van on the rear of the train. I had the ordinary hand break on the tender. The worst gradient on the line is about 1 in 200, near Abbey junction. We were seven or eight minutes late, waiting for the arrival of the 6 o'clock up train from Carlisle, due at 7 p.m. After starting we had a clear run to Drumburgh, where we arrived at 7.36 by my watch. The tickets were there collected, and the station work was completed, and I had started and got about 10 yards forward when the collision occurred. I had neither seen or heard anything of the second train before it struck me. I hardly felt the blow on the engine. I was detained till 8.20 before proceeding. The collision occurred about 7.45 p.m. I could not see the distant-signal from where I was standing, and I do not know whether it was at danger or not. I never spoke to the other driver after the collision. The last time I had seen him was about a quarter to 4 at Silloth. He was then at the jetty end, looking through a glass at the Isle of Man. We had had a pint of ale together in a grocer's shop about 12 or 1 o'clock. It is not the custom for the excursionists to give us food or money, and they had not done so on this occasion. I had got the ticket to proceed from Thomas Foster, and I got a starting-signal either from the agent or guard. I have found the distant-signal from Silloth not working properly, especially in hot weather. The 2nd was a hotish day. It was at all right when I passed it. I have never reported this signal not working properly, but I have spoken about it to the station-master. (The station-master being re-called, acknowledged that the signal had been reported, and that he had called the attention of the surface men to it. The last complaint was perhaps two months since. The signal had been last used on the 2nd for the 5 o'clock down goods train, and was then working properly, so far as he knew.)

4. *Thomas Harrington*, guard six years.—I accompanied the No. 3 train from Carlisle to Silloth, and returned in charge of Nos. 3 or 4 on the journey back to Carlisle. The combined trains consisted of 22 vehicles. I was the only guard, riding in the rear van. There was also a break carriage about the centre of the train, in which there was an inspector. We left Silloth at 7.10, seven minutes late, waiting for the arrival of the 6 p.m. train from Carlisle, which was late. We had a clear run to Drumburgh, where we arrived at 7.36. I don't know whether or not the signal was put up to protect us. I considered that the agent's duty. I collected the tickets, working from the van forwards. I had not quite finished when I heard the driver of the second train give the break whistle three times close together, when he would be between the signal and the points. I then asked the inspector whether he had collected all the tickets; he said he had, and that he had already given the driver a signal to proceed; the train was in motion, and it had got forward about two or three carriage lengths when the collision occurred. I was about four carriage lengths from the engine when the collision occurred. I did not see Davidson during the time I was at Silloth. The collision occurred at 7.45. The passengers were then all in the train. Some time afterwards I saw a great many passengers jump out of my train. My break and two carriages had been detached by the collision, and were being pushed forward by the engine of the second train. The driver of the second train seemed none the worse for

liquor. Davidson said to me at 8 o'clock that the signal had not been at danger.

Walter Grieve, traffic inspector about four years.—I had gone to Silloth with the 6 p.m. passenger train and returned at once with the combined Nos. 3 and 4 excursion trains. I rode in the break compartment of a third-class carriage about eighth from the engine. I was alone in it. All went right up to Drumburgh, which we reached at 7.38 p.m. I then helped to collect the tickets, working backwards towards the van. I noticed that the signal was put to danger to protect us. I observed the position of the disc, and it was showing danger properly, in my opinion. I was about the centre of the first train, when the beat of the engine of the second train, which was at that time just inside the signal, attracted my notice, and I went to the other side of the platform to look at it. I thought it was coming too fast, and at once signalled the driver by shouting and waving to go ahead. He at once started and had got ahead, I think, 10 or 12 carriage lengths before the collision occurred. I had not got back to the rear of the train before it happened. I heard no break whistle given by the driver of the second train after I first saw it, nor before I had seen it. I think the speed on collision must have been from 10 to 15 miles an hour. The collision occurred about 7.46. I looked at my watch about two minutes after it occurred. Driver Davidson said that the signal was clear. I replied that it was hard on, and that it was very foolish of him to be running at the speed he was. He was excited, but I do not think he was at all the worse for drink. I afterwards went to the signal with a foreman of surface-men and found that the signal was showing full on to an approaching driver, and I am confident the lever had not been moved from the position in which it had been placed after the arrival of the train. The steam was not on when I first saw the second engine.

6. *William Moffatt*, guard three years.—I accompanied the 9.30 a.m. train to Silloth on the morning of the 2nd, and returned with the same train from Silloth. It consisted of 16 vehicles, with a break carriage at the rear end. There was no other break vehicle on the train, and I was the only guard. We left Silloth at 7.35, five minutes late, detained by getting the passengers seated. I was alone in my compartment. I had not been with Davidson at all during the day. I had had a bottle of beer for my dinner, but got no food or drink from the excursionists. Nothing unusual occurred on the journey till we approached Drumburgh, when we had to stop to collect tickets. I did not notice the speed as being unusually high. I consider we should have reached Drumburgh at about 7.55, as we left five minutes late. I did not notice the distant-signal as we approached or passed it, as my attention was taken up by a man who had opened a door on the right-hand side of the centre of the train, and was out on the step, apparently talking to somebody in another compartment. I was not aware that a collision was imminent till it occurred, when I felt hardly any shock, not more than from an ordinary stop. I did not note the time, not having a watch on, but at the Citadel station Grieve told me (this Grieve denies) that it was at about 8. The speed did not strike me as being unusually high, and I have been informed that between Abbey junction and Kirkbride junction it did not exceed 30 miles an hour, as taken from the telegraph books. I had my break on easy from just beyond the distant-signal, and I was not apprehensive that we should not stop at the platform. I heard no break whistle. We had slackened both at Abbey junction and Kirkbride junction for delivering up and taking tickets.

7. *Isaac Davidson*, driver since 1869, but away for two years on the Midland Railway with a contractor, returned to the North British Company in 1875.—I know the line between Carlisle and Silloth

perfectly well. I took down the 9.30 a.m. excursion train to Silloth, and returned from Silloth at 7.35, five minutes late. I was all day at Silloth. I was not treated by the excursionists. I got my dinner about 3. The only drink I had was a pint of ale. I had on 16 carriages, one of which was a break-carriage. There was no break on the engine, but there were two break-handles on the tender, which had only four wheels. The tender weighed about 16 tons. We first slacked at Abbey junction to 12 or 13 miles an hour (the rule being 3 miles an hour) to give up the ticket, next at Kirkbride, to about 10 miles an hour (3 by rule), to take up a ticket. After this I got into a speed of about 20 miles an hour till we came to the chemical works, where I shut off steam for stopping at Drumburgh. I then saw the distant-signal showing clear, a complete knife edge towards me—not half on and half off—and it remained in this position till I passed it. It never altered. I saw the tail of the first train directly after passing the bridge (490 yards off), and gave three or four sharp whistles, my speed then being 10 to 12 miles an hour. I then put my break on, and the fireman put on his, and I reversed, put steam against my engine, and supplied sand, although the rails were dry, but nevertheless I ran into the other train at a speed of about four or five miles an hour. I could not say whether the other train was in motion or not, but it parted, and the van and two carriages remained close to my engine. I was leaning over on the left hand-rail, waving Simpson to go ahead, and jumped down when about two carriage lengths off to try and get Simpson's attention. I kept my feet. The fireman did not jump. I do not know what time the collision occurred.

8. *James Donald*, fireman eight months.—I agree with the driver's statement. I saw the signal 40 or 50 yards after passing it, when it was off.

9. *David Campbell*, foreman surface-man about eight years from Drumburgh to Kirkbride, a length of rather more than three miles.—I was at the bridge, east of the station, when the first train arrived. I had come towards the station and had nearly reached it when the second train came up and ran in. I

had heard the break whistle. The first train was in it when the collision occurred. On going back with a red flag I noticed the signal towards Silloth standing in the position to shew danger to the line. Inspector Grieve ran up behind me and said the signal was working properly. This was when I had got beyond it. I have had complaints occasionally from the agent about the signal and have attended to them.

It is stated that on the signal being tried the next day, it would not work properly twice out of four times.

The subjoined statement has been furnished me by the superintendent of the line; there are some evident inaccuracies in the times registered, due probably to the clocks not agreeing and inaccuracies of entry.

STATEMENT of the time at which the return special excursion trains run from Carlisle to Silloth and back on the 2nd July are entered in the train record books kept at the several stations and signal cabins.

Distance from Silloth.			First Special.	Second Special.
Miles.	Chains.		P.M.	P.M.
		Silloth - - left	7.15	7.35
4	54	Abbey - - passed	7.22	7.40
5	22	Abbey junction - "	7.23	7.40
9	5	Kirkbride junction - "	7.33	7.47
9	55	Kirkbride - - "	7.32	7.45
12	75	Drumburgh - arrived	7.36	7.45

The agent at Abbey states: that the driver of the second excursion train passed there at an unusually high rate of speed, and he noticed the driver put on steam immediately after passing there. This agent says he has not had any experience in estimating speed, and cannot say the exact number of miles per hour.

The agent at Kirkbride makes a similar statement, and he is quite certain that the speed was not less than 45 miles an hour.

Conclusion.

This collision was due to a want of proper caution on the part of Davidson, the driver of the second excursion train, in approaching Drumburgh station where he had to stop. Giving him the benefit of the doubt as to the position of the distant-signal, he could, had he been keeping a proper look-out, have seen the van of the first train more than a quarter of a mile off; and had he not been approaching Drumburgh at an injudiciously high speed, he ought, with the extra means he employed for pulling up, have been able to stop his engine quite clear of the van of the first train. He had been, allowing for mistakes in the train registers, evidently running at a very high rate of speed, and fast overhauling the train in front of him, for he left Silloth 20 to 24 minutes after it, and ran into it at Drumburgh, where the first train could hardly have been standing more than 15 minutes (the evidence says from 9 to 11 minutes), a gain of 5 to 9 minutes in running 12 miles 75 chains, a high average rate of speed being thus indicated, as the first train had accomplished the distance in about 26 minutes.

Both excursion trains were very ill provided with break power; the first one, consisting of 22 vehicles, having only one break-van with a regular guard, and a break compartment with an inspector riding in it; and the second train, consisting of 16 vehicles, having only one break-carriage and regular guard; this latter guard moreover does not appear to have been attending to his duty in approaching Drumburgh. The first of these trains ought to have had at the very least three break-carriages and three guards, and the second two. Had the second train been so provided, it is probable that, notwithstanding the driver's want of care, the collision would have been prevented. Much more would it have been prevented had the train been provided with continuous breaks. Thus, on one day, this collision and the one close to the Carlisle Citadel station, together involving injury to no less than 107 persons, might in all probability have been prevented, had the trains in each case been provided with continuous breaks.

In the absence of interlocking, it is impossible to decide whether or not the distant-signal was at danger to protect the first train. It is certainly time that the signal arrangements at this junction station are modernised. With a proper system of interlocking, this collision might have been prevented, as, had the loop-points been worked from a cabin, the signalman, on seeing the second train approaching too quickly, might have turned it on to the down line, where there was nothing standing at the time. And indeed, with existing arrangements, it would have been only prudent on the part of the station-master, knowing that a second train was following, to have reversed the loop-points after the arrival of the first train, so that the second train might have been turned on to the down line.

It is very little use to keep train register books if some better means are not taken to insure accuracy than appears to have been the case on the Carlisle and Silloth line.

I have, &c.,

C. S. HUTCHINSON,

Major Gen., R.E.

The Secretary,
(Railway Department,)
Board of Trade.

Printed copies of the above report were sent to the Company on the 22nd August.

NORTH-EASTERN RAILWAY.

Board of Trade, (Railway Department,)

13, Downing Street, London, S.W., 24th August 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 6th instant, the result of my inquiry into the circumstances connected with the collision which took place on the 30th ultimo at York station on the North-eastern Railway.

In this case, while a North-eastern Company's down goods train from Normanton to York was standing on the independent goods line with its van 325 yards inside the down home independent-line signal at Holgate Bridge cabin, York, it was run into by a Great Northern Company's down goods train from King's Cross to York.

A waggon examiner, John Whitfield, in the North-eastern Company's service, was found dead shortly after the collision, in the 6-ft. space between the independent and down main lines opposite the tender of the Great Northern engine. His legs were across the rails of the down main line, between the wheels of an empty carriage train which had arrived a few minutes previously, and was standing on that line. Whitfield had received severe injuries about the head, but I could obtain no direct evidence that the collision was the cause of his death, though it was so presumptively; but it is of course possible that he might have been knocked down by the empty carriage train, and received the injuries of which he died. No other servants of the companies were injured, except the guard of the Great Northern train.

In the North-eastern Company's train the van and 17 waggons were thrown off the rails and more or less damaged.

In the Great Northern Company's train the engine and tender and nine waggons were thrown off the rails and more or less damaged.

The total cost of repairs is estimated at about 120l.

Description.

At South Points cabin, about a quarter of a mile south of Holgate Bridge cabin, up and down independent lines join the main lines from Normanton and Doncaster. These independent lines then continue northwards to York station, and at Holgate Bridge cabin, they again communicate with the main lines. The points and signals at both cabins are properly interlocked, and as regards the independent down line the Holgate Bridge signalman has a home-signal 125 yards south of Holgate Bridge cabin and a distant-signal near South Points cabin, both these signals being well placed for sight. After passing the independent down home-signal for the goods yard, goods drivers are supposed to be in the yard and under the orders of shunters, &c., there being no more fixed signals for their guidance. In consequence of Holgate Bridge and a curve in the line the view of the goods yard north of the bridge is much obstructed, and the tail lamps of the North-eastern goods train could not have been seen on the present occasion by the Great Northern driver until he was within about 200 yards of them.

The lines in the neighbourhood of Holgate Bridge are practically level.

Evidence.

1. *George Whincup*, signalman at Holgate Bridge.—I am a signalman in the service of the North-eastern Company, and have been seven years signalman at Holgate Bridge. I came on duty at 10 p.m. on the 30th July for an eight hours shift. I keep a train register. The Normanton goods train passed my cabin at 11.4 p.m., as entered in my book. Being a train on the independent line it was not rung on to me from the South Points cabin. The train stopped on the independent line about 200 yards past my cabin. The van had on two side lights and a tail light, which I saw burning; they were good lights. I had taken off my home-signal for this train, but not the distant, as the driver had passed it before he whistled for the home-signal. I had not taken off the down independent distant-signal since I came on duty. I am quite sure that I saw the back light of this distant-signal showing that it was in the position of danger. After the North-eastern train had passed I put the independent home-signal on to danger. I saw the back light of the signal showing "green," denoting that it had returned to danger. I never took off this home-signal again before the collision. At 11.9 p.m. a train of empty carriages passed on the main down Normanton line, and a Normanton up goods train passed along the up independent at 11.14 p.m. The first intimation I received of the Great Northern down goods train was seeing it pass my cabin. I had heard no whistle from the driver of this train previous to this, and there was no whistling going on which would have prevented me from hearing the Great Northern driver whistle, had he done so. The train was running at a speed of 20 or 25 miles an hour, a most unusual speed at this place, where the speed is usually from 2 to 3 miles per hour, as the trains are drawing up. One of the windows of the cabin was open, and I shouted to the driver as he passed to look out. There was not sufficient light to enable me to see what was being done on the engine. I observed that steam was on. I saw nothing to lead me to suppose that the driver heard me shout, or that his attention was otherwise attracted; but after he had passed the cabin I saw fire flying from the wheels of the engine as if it had been reversed, but I did not notice the steam being shut off. The van of the Great Northern train came to a stop a little on the station side of the cabin. I did not notice whether the van break was applied. The collision occurred at about 11.18 p.m.; I booked it at once. I saw the driver of the Great Northern train directly after the collision about the centre of the train; he seemed all right, and not under the influence of drink, nor did he smell of drink. I asked him if he was any worse, and he said, no. I asked him if the signals were on, and he said, yes. I asked him what he was doing, and he said he did not know. There was a train of empty carriages standing on the down main Normanton line inside the junction, with a tail lamp on it, about 250 yards from the cabin. The van of this train had a proper tail light on it. The engine of the Great Northern goods train and the van of the North-eastern up train passed the cabin about the same time. I saw fire flying from the tender wheels at the same time I saw fire flying from the engine wheels.

2. *George Eckles*, North-eastern signalman about 4½ years, two years at South Points cabin.—I came on duty at 6 p.m. on the 30th ultimo, for a 12 hours shift. I keep a train register. The North-eastern train passed my cabin at 11.1. I did not notice whether the distant-signal from the Holgate Bridge cabin was lowered for this train. Soon after the North-eastern train had passed I looked at this signal and it showed a good red light. I looked along the line to see if the North-eastern train was clear, and then observed that the distant-signal for the Holgate cabin independent line was at danger, and I likewise observed that the home-signal for the indepen-

dent line worked from Holgate Bridge was also at danger; this signal is the top lamp of the three on the low signal-post. The Great Northern train was then signalled as passing Naburn at 11.8. I was able to give line clear for it as the North-eastern goods train had already entered the independent. The Great Northern train passed my cabin at 11.14. I had not lowered the distant-signal for this train having been waiting to hear it whistle, and it not having done so before it passed the distant-signal. I observed by its head lights where it wanted to go, and set the points and lowered the signal for the independent line, although I had not heard the driver whistle at all. The train passed my cabin at a speed of 20 or 25 miles an hour. It was a faster speed than usual for a heavy train. I saw the driver and fireman, and they appeared to be looking to the front. The steam was on when the engine passed. I did not notice whether the van break was on. A goods train of this description usually takes from six to eight minutes to run from Naburn to my cabin; this train took six minutes. After the train had passed into the independent, I again looked towards Holgate Bridge and saw that the distant-signal was at danger. I could not see the home-signal on account of steam from the engine. I knew that the second goods train was a Great Northern train by the position of the head lights, and it had on a light load. I am sure that the Great Northern engine-driver had steam on when passing my cabin by the puffing noise. I do not think the engine was reversed. The up Normanton goods train was drawing up at the up independent signal at the time the Great Northern goods train was passing into the down independent. There were no other down signals off that I saw which the driver could have mistaken. I know that all goods trains after entering the independent are supposed to stop in the junction, that is, north of Holgate Bridge. The Great Northern train is sometimes stopped and sometimes has a clear run. The North-eastern goods train on the up line to Normanton passed my cabin at 11.15, it was not quite stopped, but very nearly.

Frederick Thompson, North-eastern goods guard, 13 years in the service.—I started from Normanton on the evening of the 30th ultimo at 9.55 p.m., 30 minutes late, with a train of 25 waggons and a van for York. We did no work on the road. We had a clear run, and arrived at Holgate Bridge at 11.5 on the independent line. The tail of the train stopped about 200 yards inside Holgate Bridge cabin. The tail of the train never moved from that position until it was struck. As soon as the train arrived the engine left the train, and went away to turn and get water, as it had to return with another train to Milford junction; the pilot engine in the meantime had taken away part of the waggons from the front of the train, and was on its way to rejoin the train when the collision occurred. The waggons were knocked forward and came into collision with the waggons attached to the pilot engine. I saw the Great Northern train coming from under the bridge and had just time to jump from my van before the collision. I jumped out on the left side of the van and escaped without injury. I was looking at the Great Northern engine as it ran into the van. I cannot say whether the engine was reversed. I observed no fire flying from the wheels of the engine or the tender. Steam was coming out of the funnel, but whether it was reversed or not I cannot say. I thought the speed at which the engine struck the van was from 20 to 25 miles an hour. The engine of the Great Northern train stopped in its own length. I think the collision occurred about 11.15 p.m., about ten minutes after the train had arrived. I heard the train coming, looked out of the window, and seeing the engine I jumped out. Neither the driver nor the fireman of the Great Northern engine jumped off.

I saw the driver shortly after the collision when he was still on the engine; I was on the ground. I asked him if he was any worse and he said no. I did not ask him nor did I hear him say how he came to run into us. I was not near enough to smell his breath but he appeared perfectly sober. The van and a number of waggons were damaged. My break was off. I had taken it off after arriving. About ten minutes after the collision looking under the tender I saw Whitfield, the deceased, lying between the independent and the down main line. We made up five minutes on the journey between Normanton and York, arriving at York 25 minutes late. We were 30 minutes late in starting in consequence of having to go to Wakefield out of the ordinary course. We generally run to time with this train, and we are generally clear by the time the Great Northern train is due.

George Hill, Great Northern goods guard, seven years in the service.—I joined No. 178 down Great Northern goods train at Retford on the 30th ultimo. We left at 8.10 p.m., 10 minutes late, and we left Doncaster at 9.50, right time, with a load of 29 waggons (7 empty, 22 loaded), and a van in which I was alone. The engine had accompanied the train from Peterboro'. I saw the driver of the train at Doncaster, but I had no communication with him further than giving him "right away." We had stopped in the goods yard at Doncaster near the C box about 25 minutes, but I cannot say whether the driver had been away from his engine. We did not stop anywhere between Doncaster and York. On approaching the South Points cabin at York I did not hear the driver whistle for the independent, but I am confident the distant-signal was off and the home-signal. Just before reaching the south points I noticed that both the Holgate Bridge home and distant signals for the independent line were at danger. The down home-signal for the independent from Holgate Bridge is the top light on the short post. I saw this home-signal both before and after passing the footbridge, and it was still at danger. Considering that the independent signal was at danger I thought that the speed was too fast to enable us to stop at the home-signal. I applied my break as soon as I saw that the independent home-signal was at danger. Had the signal not been at danger I should have applied my break slightly, but as it was I applied it as hard as I could. The break appeared to work properly and the wheels skidded. I cannot say where the driver shut off steam but the speed did not appear to diminish after we passed the south points. I think the speed would be 20 miles an hour when we passed the independent home-signal. The usual place for shutting off steam is near the North Lane cabin. I did not feel any indication in the van to show that the driver had applied his break or reversed. The first check I felt was the collision which knocked me down on my back: I had hold of the break at the time. I still feel the effects of my accident. I have been back to duty about a week. As far as I know it is not the practice to run past the Holgate Bridge home-signal when it is at danger. I have not noticed that it is the custom to give the driver a caution signal when the home-signal is at danger. The van stopped dead after the collision had taken place. I do not know how many waggons were damaged but think there were more than nine wagons off the road. York is the end of my journey. Had there been no other train in the way my train would have stood at about the place occupied by the North-eastern train. It is uncertain whether or not we are detained by some other train being in the junction. I have often worked with the same driver previously, and have never known him run by signals on any previous occasion, and I have never known him to be the worse for liquor.

5. *Samuel Crick*, fireman, Great Northern Railway. Nearly two years fireman, previously cleaner for three

years at New England, Peterboro', *cautioned*.—I had only been once previously to York, viz., on the 26th ultimo, with the same train and with the same driver. I joined the train at Peterboro'. We stopped at Doncaster, and were some little time in the Doncaster goods yard: during this time the driver did not leave the engine. After leaving Doncaster we had a clear run to York. I do not remember being turned on to the independent line at York, not being sufficiently well acquainted with the place. I do not know what signals I had to observe on approaching York, and cannot therefore say if they were off or on. I think our speed was about 15 miles per hour just before striking the North-eastern train. The driver told me to put the tender brake on just before we struck. I heard no shouting just before this. Steam had been shut off perhaps two minutes before the engine struck the North-eastern train. I saw the tail lights of the train just before we struck it; they were three good tail lights. I had only made two trips previously with Driver Cooper, but I believe I was to be his regular fireman. I had been previously employed as fireman on pilot engines in New England yard. I had made other trips to Doncaster. Steam was shut off before we came to Holgate Bridge. We neither of us jumped off the engine, but a good many coals tumbled down from the tender on to the engine. I think we ran about an engine's length after striking the train. I am acquainted with the general duties of a fireman.

6. *William Oliver*, locomotive foreman, Great Northern Railway, York.—I saw Driver Cooper shortly after the collision; he was quite sober, and did not smell of drink. I asked him how he had managed this, and he said he had made a mistake. Some hours after he stated that he was busy with his injector, and that he reversed his engine after passing Holgate Bridge, but that the lever flew forward again. Driver Cooper entered the service of the Great Northern Railway in 1864, was promoted to fireman May 5th, 1867, and promoted to driver October, 1874. He has borne a good character both as fireman and driver, nothing being recorded against him. He has been running for the last two years on alternate days on the down journey from Peterboro' to York. He had not been employed on the company's duty since between 4 and 5 on Sunday afternoon until he commenced his journey from Peterboro' at about 2.30 on the Tuesday afternoon, and his day's work would have terminated at York.

7. *Thomas Tudge*, goods guard, North-eastern Railway.—I knew Whitfield, the deceased. I had not seen him previously on the night of the collision till I found him dead about five minutes after the collision had occurred. He was probably on his way to examine the Great Northern goods train. His body lay between the independent and the down main line in the "6-ft." opposite the tender of the Great Northern Engine. His legs were across the rails of the down main line between the wheels of the empty carriage train. He had received severe injuries about the head.

8. *William Cooper*, driver, Great Northern Railway, *cautioned*.—I began as driver in October 1874, and am well acquainted with the line between Peterboro' and York. I travel the down journey every alternate day with the same train. Fireman Crick has been with me one previous trip to York and once to London and back. I have no complaint to make against the fireman, who is likely to make a useful man. The fireman is quite unacquainted with the York signals. I left Peterboro' at 3.40 p.m. with a six-wheeled coupled engine and a six-wheeled tender. There was no break on the engine, only an ordinary hand-break on the tender. Everything on the engine was in good working order. I believe we left Doncaster at right time, 8.50 p.m. We were not slackened by signal on the road, but ran through Selby at six miles an hour.

As we approached the South Points cabin at York, I found both the home and distant signals showing white lights without whistling for them. The home-signal was off for the independent line. I had shut off steam about 100 to 150 yards before coming to the south points, and at the same time saw that the independent distant-signal from Holgate Bridge was showing a red light. I have only seen this distant-signal off about once before during the six months I have been running on this independent line into York yard. I caught sight of the home independent signal when I was running through the south points. I refer to the top signal on the low post beside the main line signals. This signal was also showing a red light. After seeing the distant-signal at danger I put on the right-hand injector feed, and I was occupied with the injector, which would not work properly, when passing along the independent line. About

50 or 100 yards before reaching the home-signal I perceived that my speed was too great, and that the fireman was not applying his break as I thought he had been doing. I said, "Hold on; hold on!" and reversed my engine, and had got the lever over somewhere about Holgate Bridge, when it flew back and in doing so threw me across the foot-plate opening the regulator. I just had time to get up and shut the regulator when the collision occurred. I had finished my last journey about 6 p.m. on Sunday evening. I have on previous occasions run past the home independent signal but have then been called on by hand-lamp from Holgate Bridge cabin; I did not see any hand-lamp on this occasion. It is not the practice to run past this signal unless such hand-signal is shown. It was necessary to attend to the injector at this time as the water in the boiler was becoming low.

Conclusion.

There is no doubt as to the cause of this collision, which was brought about by the Great Northern Company's driver, William Cooper, running past the Holgate Bridge home-signal for the independent line, which was at danger against him, and striking the van of the North-eastern goods train, 325 yards inside this signal, at a high rate of speed. Why he should have done so, acknowledging as he does that he had seen the signal at danger for a considerable distance off, it is very hard to understand. There is not the least suspicion that he was under the influence of drink, he had been on duty for only about eight hours after an interval of rest of nearly two days, and he was perfectly well acquainted with the York signals.

His own excuse as to having been so engaged with his injector as not to have observed the speed at which he was approaching the Holgate Bridge home-signals can hardly be entertained. His previous character is stated to have been very good.

The waggon examiner who was killed was probably on his way to examine the Great Northern train on its arrival. As I before stated, no direct evidence was procurable as to the precise mode in which he met his death, and it is just possible from the position in which he was picked up that he might have been knocked down and fatally injured by the train of empty carriages which had arrived on the main down line a few minutes before the collision.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the North Eastern and the Great Northern Railway Companies on the 2nd September.

NORTH LONDON RAILWAY.

SIR, Board of Trade, (Railway Department),
13 Downing Street, London, S.W., 6th September 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the order of the 27th ult., the result of my inquiry into the circumstances connected with the accident which occurred, on the 21st ult., at Haggerstone station, on the North London Railway, to a passenger named Vincent Symmonds, aged 71 years, who fell between the platform and the train while alighting, and subsequently died from the injuries he received.

The train by which this passenger was travelling was the 9.20 p.m. up' passenger train from Enfield to Broad Street, and the accident happened on the arrival of this train at Haggerstone at 9.57 p.m., 4 minutes late.

Description.

At Haggerstone station there are four lines of rails, with an island platform between each pair of rails, and an additional platform on the up-side.

This platform, which is the one upon which the accident occurred, is 405 feet in length, and 17 feet in width, with pillars 7 feet 6 inches from the edge supporting a pent roof.

The line is nearly straight and level.

The platform is 2 ft. 11 ins. above the level of the rails, with a coping overhanging the brickwork $1\frac{1}{2}$ ins. to 2 ins., the edge of which is 2 ft. 5 ins. from the working face of the rail, $5\frac{1}{2}$ ins. from the edge of the steps, and 9 ins. from the overhanging sides of the carriages.

The carriages are close coupled, and are fitted with wooden steps 2 ft. 6 ins. in length, and 10 ins. in width, the top of the tread being 3 ins. above the level of the platform at this station, and also with a continuous footboard 18 ins. lower than the steps, and projecting the same distance from the side of the carriages.

The ends of the carriages are 13 ins. apart, and the ends of the footboards 19 ins. apart.

The following is the evidence given by servants of the Company.

Evidence.

Alfred Bryant, porter North London Railway Company 18 months, states :—I have been at Haggerstone as porter for 18 months. On Wednesday 21st inst., at 9.53 p.m., I was on the up platform in charge. The 9.20 p.m. up train from Enfield arrived, running up to the platform at its usual speed. It was about three minutes late. There were not many people on the platform, nor were there many passengers in the train. I was walking towards the up-end of the platform, with my face looking the same way as the train was running, when I heard some one cry out behind me "Hold on," "Stop stop." At that time the engine had just passed me, and was going at about two or three miles an hour. I turned round, and ran back between three or four carriages, and found a porter and a passenger lifting a man up on to the platform. He was, I think, on the lower foot-board. I don't think he had been on the ballast at all. I assisted him to a seat, and helped him to his home, some 70 or 80 yards distant. He walked home. The train pulled up at the usual place at the platform. The man made no statement to me how he fell. He must have been in a second-class carriage, as they were all in front, and I found the door of the last compartment of the third carriage from the engine open. There was no other passenger in that compartment. It was off the end of the foot-board of this carriage that he was helped up. I opened no door, and there was no other servant of the Company near who could have done so. I believe the man was about 71 years of age. There is a rule forbidding the door of any carriage being opened until the train has stopped.

Leonard Dennis, porter two years, states :—I have been two years at Haggerstone. On the 21st inst. I was on the platform when the 9.20 p.m. up train from Haggerstone arrived. It came in very steady, and stopped at the usual place without any rebound. I was standing at the head of the stairs at the down end of the platform, and the engine and five or six carriages had passed me when I heard a man call out "Oh! oh!" as if he was hurt. I turned round to see what it was, and saw a hat lying on the platform about four carriage lengths off. I ran up to see what was the matter, and when I got to the hat I could not see any disturbance or anything wrong, but in looking ahead I saw, about 10 or 12 yards off, a man's hand on the platform, raising himself up, I then saw his head, and then went and helped him up. The train was just stopping at the time. He was on the end of the lower foot-board, but I can't say exactly of what carriage. It was a second-class carriage. The door of the nearest compartment was open. I did not open any carriage door, and when the carriages passed me no door was open. The station was lit up, and there was plenty of light. It was I who called out to

Bryant to hold on. The train did not stop and then go on again.

Thomas Brett, passenger guard 10 years, states :—On the 21st instant I was guard of the 9.20 p.m. up train from Enfield to Broad Street station. It was made up as follows :—tank engine, running chimney first, one front break-van; three second-class, three first-class, two third-class carriages, and rear break-van. I was in the rear van, and there was no one in the front break-van. The train is fitted with Clark and Webb's chain break. The rear van and three rear carriages were connected and worked from my van. The two first-class carriages in the middle of the train were not broken. The front carriages and front van were broken from the engine. We left Dalston four or five minutes late, and arrived at Haggerstone at 9.57 p.m. four minutes late. We ran in usual speed, and pulled up at the same place as usual. I noticed nothing wrong till the train had stopped. I saw some passengers going to one of the seats, and before starting the train I went to see what was wrong. I found a man sitting down hurt. I asked how he was hurt, and two passengers said by alighting before the train stopped. I don't know whether they saw him fall. They were in another compartment of the same carriage. One of them told me he saw the door of the next compartment fly open before the train stopped, but did not see anyone get out or fall. The platform was properly lit up. I put on my break as usual when running in. The drivers' breaks were not on.

George Wilson, serjeant of railway company's police, states :—I examined the platforms at Haggerstone on the morning after the accident. There was a distinct continuous mark on the brick-work of the platform for a little over 10 yards where the body of the deceased had been dragged along. It was a little above the level of the lower foot-board. There were also marks at intervals on the ballast for the same distance, as if a foot had been dragged along it.

A copy of the depositions taken before the coroner in this case was procured for my information, and according to the evidence of one person, the deceased stated before his death that he was getting out of the train after it had stopped, and that it went on again, and caused him to fall. The statements of the servants of the Company on this head are, however, confirmed by independent testimony. The medical evidence is to the effect that the causes of his death were "shock, injury to the spine, and rupture of the liver, accelerated by the method he was taken home." There is evidence other than that of servants of the Company that he did not appear to be much hurt, seemed quite able to walk, and made no objection to walking home, a short distance only.

Conclusion.

From the foregoing evidence it appears that the deceased, Vincent Symmonds, in attempting to alight from the rear compartment of the third carriage from the

engine of the 9.20 p.m. up train from Enfield, while this train was still in motion, running into Haggerstone station, unfortunately fell off the edge of the platform, or off the step of the carriage, on to the continuous footboard, and that he died from injuries received by being dragged along between the side of the carriage and the platform.

The train does not seem to have stopped, and then moved on again, nor was the door of this carriage opened by any servant of the Company.

The steps of the carriages on this line are wooden, and longer than is often the case; but it would be far better if they were prolonged so as to form an upper continuous footboard, with the ends projecting far enough to leave as small an interval as possible between the ends of the footboards of two adjoining carriages, and also widened so as to leave a horizontal distance of 3 ins. to 4 ins. instead of $5\frac{1}{2}$ ins. between the edge of the platform and the footboard.

This footboard would be 3 ins. above the edge of such platforms as Haggerstone, and, I understand, above the other platforms on this line; and if all the carriages were so fitted, an accident of this description would be impossible on such platforms.

I have, &c.

The Secretary,
Railway Department, Board of Trade.

F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on the 20th September.

SOUTH-EASTERN RAILWAY.

Board of Trade, (Railway Department,)

13, Downing Street, 20th July 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 6th instant, the result of my inquiry into the circumstances which attended a fatal accident to a female passenger named Weaver, at the Cannon Street station of the South-eastern Railway, on the 4th instant, who, in attempting to alight from a train still in motion, fell on to the platform, and then rolled off it and dropped between the platform and the carriages still in motion, and a wheel or wheels passed over her neck or head, and she was killed on the spot.

The evidence in this case is as follows :

William Gallen, platform inspector 11 years, and 18 years altogether in the service of the Company, states: that he was on duty on the morning of the 4th July, and was standing on No. 1 platform, the western or Charing Cross platform, and saw the 8.5 a.m. train enter the station from Erith. The train consisted of 17 vehicles, and his attention was first attracted to No. 269, third-class carriage, by observing a middle-aged woman place her right foot on the continuous footboard. This train entered the station on the western side of the platform, and the woman was about to get out at the right side of the carriage, and after placing her right foot on the footboard outside the carriage she then advanced her left foot in order to step on to the platform, and turned partly round, thus bringing her back to the engine: that the train was still in motion, at the rate of about three or four miles an hour, and as she alighted she fell directly on to the platform, and rolled towards its edge: that he was standing about two carriage lengths north of her at the time she fell, and he ran towards her at once, but did not reach her soon enough to prevent her from falling over the edge of the platform: that the carriage in which she had been riding passed her as she was on the platform, and she rolled off it as the next carriage behind No. 269, passed on: that he caught hold of her by her right arm as her left arm fell over the iron step of the next carriage, and he thinks her legs fell on the lower continuous foot-board: that he was knocked down by the people on the platform, who had rushed to the edge of the platform to see what had happened, and

she was taken up about two carriage lengths ahead beyond the spot where he was knocked down: when he saw her next she was lying between the rails and the platform: he saw her legs, but not her body, lying near the leading end of the second carriage in rear of No. 269: that he is unable to say who opened the door of the centre compartment of the carriage in which she was riding, but he did not see any of the Company's servants open any of the doors in that train. No. 269, third-class carriage, was the sixth carriage from the engine: the train was very full. The accident occurred about 8.58 a.m. It was a fine morning. He had called out twice specially to the woman "wait until the train stops," but she did not take any notice of it. The carriage No. 269 had five compartments, and there was an upper continuous foot-board, which did not extend beyond the end of the carriage. The next carriage behind No. 269 was also a third-class carriage with five compartments, and iron steps outside each door: he did not know its number, and believes the next carriage behind it was a first-class carriage, but was not certain about it, nor about its number.

Jesse Osborne, head guard of the 8.5 a.m. up train from Erith on the 4th, states: that the train consisted of a tank-engine and 16 vehicles. No. 269, a third-class with five compartments, was the sixth vehicle from the engine: it was followed by a second-class carriage, No. 141, with five compartments, and then came a first-class carriage, No. 1,742, with four compartments; No. 141, second-class, had one continuous

foot-board, and none below. No. 1,742, first-class carriage, had two continuous foot-boards: that he knows nothing about the accident: he rode in the rear break: the train entered the station at the usual speed, a walking pace, about three miles an hour. The accident occurred about 8.58 a.m.: he did not see any of the doors of the carriages opened by any of the servants of the Company. The train did not stop and then go on again.

Thomas Pearce, foreman carriage examiner, states: that No. 141, second-class carriage, had five compartments: it was fitted with the continuous foot-board above—none below,—but it had short boards below. First-class carriage, No. 1,742, had four compartments, and it had two continuous foot-boards, but the continuous footboards do not in any case extend beyond the ends of the bodies of the carriages.

I requested the Company's general manager and secretary, Mr. Shaw, to supply me with a copy of the evidence which was taken at the coroner's inquest held on the 6th instant, but was informed that no shorthand notes of the evidence given at the inquest were taken, and he was not therefore enabled to comply with my request.

From the preceding statements, and from an examination of the locality and of a similar carriage to that in which the deceased was riding, I learn that she was a passenger in the 8.5 a.m. train from Erith to Cannon Street on the day in question, and that she rode in the centre compartment of a third-class carriage which was the sixth vehicle from the engine; and that as this train, consisting of a tank-engine and 16 vehicles, was entering the Cannon Street station at a speed of three or four miles an hour, on the line on the western side of No. 1 or the Charing Cross platform, the accident occurred.

It appears from a newspaper report to have been stated at the coroner's inquest by a fellow passenger riding in the same compartment, who I did not see, that the deceased opened the door of the compartment herself; and that as she was in the act of getting out on the right side of the carriage, as the train was then running, she placed her right foot on the continuous foot-board outside the carriage, and then her left foot on to the platform, turning her back to the engine, and that she immediately fell on to the platform, as most persons would do, in attempting to get out of a carriage in the contrary direction to that in which the train was running. It further appears that she then rolled towards the edge of the platform, and fell off it between the platform and the carriages, and a wheel passed over her neck or head, and she was killed at once.

One of the Company's inspectors was on duty at that time (8.58 a.m.) on the Charing Cross platform, and he called out to her, when he saw her in the act of getting out of the carriage, to wait until the train had stopped, but she took no notice of his caution, and when he saw her fall he caught hold of her arm and tried to save her from rolling off the platform, but he was himself knocked down by the people on the platform, rushing to the spot to see what had occurred, and he was obliged to let go of his hold.

There is a slight discrepancy in the statements of this inspector and of the guard of the train and a carriage examiner, as to the carriage behind that in which the deceased rode being a second or a third-class carriage, and also whether it was or was not fitted with a continuous foot-board similar to that on the carriage in which she rode, or if it only had iron steps outside the carriage doors; but I am disposed to think the inspector was mistaken, and that it was a second-class carriage No. 141, fitted with a continuous foot-board nearly on the same level as that on No. 269 third-class carriage, in which she had been riding.

The height of the platform where the accident happened was 2 feet 11 inches above the level of the rails: and the working face of the rail was 2 feet $4\frac{3}{4}$ inches from the edge of the platform. The floor of the third-class carriage No. 269 was $16\frac{1}{2}$ inches above the level of the platform, and it had a continuous foot-board which stood about five inches above the level of the platform, and the edge of the foot-board was about $3\frac{1}{2}$ inches from the edge of the platform. The continuous foot-board did not however extend beyond the framing of the body of the carriage, and thus there was a space of 2 feet 2 inches between the end of this continuous foot-board and the buffer, and if the adjacent carriage was similar, as it is stated to have been, there would thus have been an open space of 4 feet 4 inches between the ends of the continuous foot-boards attached to the carriages Nos. 269 and 141, a space sufficient for the deceased to have fallen off the platform, and between it and the carriages of the train. If both carriages had had the ends of their foot-boards continued as far as the outer ends of the buffer castings, there would not have been an opening of more than two feet, and this smaller opening would not have been sufficient to admit of the deceased rolling off the platform after she fell, and her life would probably have been saved.

I am not aware that any of the railway companies that have caused upper continuous foot-boards to be added to their passenger carriages, instead of iron or wooden steps outside the carriage doors, have in any instance extended these continuous foot-boards to the outer ends of the buffer castings at the ends of the bodies of the passenger carriages: but that it is of importance that this should be done, in order to prevent fatal accidents, is, I think, proved from what has occurred in this accident: and from the inquiries which I have made, I have reason to think that a similar fatal accident which happened at the Blackheath station of this Company on the 27th April 1878, from a passenger falling on the platform while running alongside a train in motion, was also due to the passenger falling off the platform between it and the carriages through the opening between the ends of the continuous foot-boards of two adjacent carriages.

It is therefore, in my opinion, very much to be regretted that more consideration was not given to the question of adding continuous foot-boards to passenger carriages before it was determined to make them shorter than the framing under the bodies of the carriages, instead of extending them, as far as the outer ends of the buffer castings at the ends of these carriages, so as to diminish the opening between the ends of the continuous foot-boards on adjacent carriages. I am not aware of any reason why this should not have been done.

The subject of the addition of continuous foot-boards and their length is still deserving of the serious consideration of the Directors and Officers of the various railway companies in the United Kingdom, as will be readily admitted, I am sure, when I state that about fifty persons lose their lives annually by this class of accident, in addition to a very large number who are more or less injured.

Indeed this class of accident proves far more fatal to human life than the serious accidents or collisions between trains, that occur in the course of each year.

It may be admitted that the greater portion of these accidents are caused by the imprudence or want of caution of the parties that suffer: but in the greater portion of these fatal accidents I believe it will be found that they are mainly due, as in this instance, to the parties not knowing how to get out of a train in motion, if they choose to attempt it, in the proper way.

I have, &c.

W. YOLLAND,
Colonel.

The Secretary,
(Railway Department,)
Board of Trade.

Printed copies of the above report were sent to the Company on the 17th August.

SOUTH-EASTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., 31st October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 7th ultimo, the result of my inquiry into the circumstances connected with the collision which took place on the 3rd ultimo at Waterloo junction station on the South-Eastern Railway.

In this case, the 11.50 a.m. up passenger train from Hastings to Charing Cross came into collision with an up train of empty carriages from Blackheath also to Charing Cross, which was stopping at Waterloo junction station.

No passengers or servants of the company were injured.

The damage to rolling stock was confined to the fracture of a coupling in the empty train.

Description.

Between Cannon Street West junction and the east end of Waterloo junction station, a distance of 1,100 yards, there are no less than four signal cabins, viz., Cannon Street West, Blackfriars junction, Blackfriars, and Waterloo station. The traffic is worked on the absolute block system, and the block sections are necessarily

very short, the distance between the up home-signals at Cannon Street West junction and Blackfriars junction being only 195 yards, between those at Blackfriars junction and Blackfriars 577 yards, and between those at Blackfriars and Waterloo station 294 yards. Each cabin is provided with distant-signals as well as home-signals, the up distant-signal for Waterloo station being 247 yards from the up home-signal. There are two up lines from Cannon Street to Charing Cross, and this collision occurred on the up main line, the tail of the empty train having stood 60 yards inside the Waterloo station main line up home-signal, or 307 yards inside the up distant-signal. These signals can be well seen by an approaching driver.

Evidence.

1. *Henry Smart*, signalman three years, 1½ years in Waterloo station cabin.—I came on duty at 2 p.m., working alternate weeks 9 hours and 10 hours a day. I have six signal levers; no point levers. I have a telegraph boy to assist me; the next block cabins are Waterloo junction and Blackfriars. We work strict block system, no two trains being admitted into the same section at same time. The practice is to give "line clear" for up trains when we see the tail of the previous train has passed the cabin, the cabin being 34 yards west of the up home-signal post. In the case of an empty up train standing beyond the cabin, I should keep the next section blocked. The same rule applies whether trains are stopping or running through. In case an up train is standing at the station, I should keep both up home and up distant signals at danger. I got the signal for the up empty train at 2.13 p.m., and took my signals off for it, but it was stopped at the station by a train ahead, the Waterloo junction signals remaining at danger. After the train had arrived, I put both my signals to danger at once, the distant signal first and then the home, and gave "line clear" for the empty train at 2.16, three minutes before the Hastings train was signalled in, at 2.19; it having been previously signalled in error on the local line at 2.17. I first noticed the Hastings train passing Blackfriars box, where the signals were clear for it, coming on slowly. My attention was then called to a Greenwich down train, and I did not again see the Hastings train till its engine was passing my cabin, when I observed efforts were being made to stop. The speed of the Hastings train was not more than four miles an hour when the engine passed. The day was bright and the rails dry. The collision occurred at about 2.25 p.m., while the Greenwich down train was standing at the station; but the engine of this train was not so far east as the tail of the empty train, and would not hide it from the driver of the Hastings train. No wheels left the rails. There was no one in the cabin beside me and the telegraph boy.

2. *Edwin Ludlow*, guard, 3½ years.—I came from Blackheath with a train of 13 empty carriages for Charing Cross. We came from London Bridge, without going into Cannon Street, on the main up line. I was in the rear carriage of all, a third-class break carriage. I was the only guard. The train was provided with the ordinary breaks. The Waterloo station signals were off for us, but the junction signals being at danger we stopped at the platform, with the rear carriage about five carriage lengths inside the stop signal, at about 2.17 or 18 p.m.; and we were run into by the Hastings train at 2.24 p.m. I was on the seat of the break compartment at the time. We had just got the starting signal at the junction taken off for us, but the train had not got into motion. I had not then seen or heard the approach of the Hastings train. There was a Greenwich down train standing at the platform when the collision occurred. I was knocked off my seat, but not hurt, though I was in the rear compartment. The coupling belonging to the engine was broken; the only damage done. My break was off at the time. I did not ask the driver of the Hastings train how he had come to run into us.

I had not noticed whether the station signals were at danger to protect us.

3. *John McMillen*, driver 24 years on the South-Eastern Railway, and previously on the London and North-Western Railway.—I joined the 11.50 a.m. train from Hastings at Cannon Street with engine No. 104, a four-wheel coupled tender engine, running engine first. There was the usual hand break on the six-wheeled tender, but no continuous breaks on the train, which consisted of 15 coaches and two guards. We left Cannon Street at 2.17, having to stop at Waterloo junction. On approaching Blackfriars box on the main line I found the signals clear, that is the distant signal and both the home signals off, but the distant signal worked from Waterloo station box was at danger, and also the Waterloo station box home-signal for the main line; I saw this when I was running between Blackfriars junction and Blackfriars cabin. No change took place in the position of the Waterloo station signals, and my intention was in consequence to stop at the Waterloo station up home-signal, but between Blackfriars junction and Blackfriars I found (the speed being about eight miles an hour) I could not shut the regulator handle, which was about half way open, and it remained in this position up to the time of the collision. On finding this I whistled for the guard's break, just on the Cannon Street side of Blackfriars cabin, and again directly after passing it. I then reversed the engine about half-way between Blackfriars and Waterloo cabin, but the reversing lever flew back, and I did not get it over again till I was at the end of the platform, and then the regulator was still sticking. I had my tender break applied on first whistling for the guard's breaks. I had reduced my speed to about four miles an hour when I struck the tail of the empty train. I should not have wanted the guard's assistance, but for the sticking of the regulator. I had commenced working with the engine at 8 a.m., and had run from Redhill to London; after which I had been engaged in local trips. Nothing had up to this time gone wrong with the regulator. I had no trouble in opening it on starting from Cannon Street, and had eased it a little more in running round the curve near the Borough Market. I reduced the steam to 50 lbs. from 120 lbs. before taking the train into Charing Cross, but even then I could not get the regulator fully back. It had never worked perfectly right since I had had the engine. I had called the attention of the locomotive foreman at Redhill to the regulator about three months since, but its working had not been sufficiently defective to cause me to make a report of it. After reaching Charing Cross I put some tallow into the feed pipe, and so got it into the boiler, and this made the regulator work much easier afterwards, and I was able to take a train down to Redhill the same afternoon. The engine worked for four days after this, and was then sent to Ashford to be examined. I was suspended the day after the collision and am so still. I have never been in any previous collision. I saw the tail of the empty train about 100 yards from it. It is not the custom to hand signal trains past the Waterloo station home signals.

4. *Moses Castle*, fireman with *McMillen* since June 1, previously employed about engines, cleaning, &c.—I was alone with *McMillen* on the engine when he took the *Hastings* train from *Cannon Street*. The first signals we had against us were the *Waterloo* station signals. The driver took hold of the regulator handle between the *Blackfriars* junction and *Blackfriars* cabin, the speed being between 8 or 9 miles an hour. I began putting on my break at the same place. On passing *Blackfriars* box the driver shouted to me to put on my break. I turned round to look at him and I saw him having hold of the regulator, appearing to be trying to shut it. It was not quite shut, but allowed sufficient steam to be on to keep the engine moving. I saw him trying to reverse, but I heard the reversing lever fly back. After passing the *Blackfriars* box I believe he whistled twice for the guard's breaks. I could have jumped off before the collision, but I did not, nor did the driver. The buffer-beam was not damaged. I have often heard the driver grumbling when working with the regulator. I did not see any means taken to reduce the steam before going into *Charing Cross*. The driver did something to the engine, but I don't know what, at *Charing Cross*. The engine behaved properly the rest of the day. I worked after this four days with the same engine, but with different drivers. We never had much difficulty with the regulator, but the steam was always escaping. After that it went into the shops, and it is now working better than it was before.

5. *James Lawrence*, guard 6½ years.—I started from *Hastings* in charge of the 11.50 a.m. train; it consisted of ten carriages, two guards vans, and two horse boxes. We detached the two horse boxes at *Tunbridge*, and picked up three carriages at *Grove Park*. From *Cannon Street* I was in the last vehicle. We were 10 minutes late from *Cannon Street*, having lost time at *Tunbridge* and *Grove Park*. We had no signals against us after leaving *Cannon Street* till we found the *Waterloo* station distant and home signals at danger; these I saw just after passing *Blackfriars* junction. Our speed was then 10 to 12 miles an hour. I applied my break at once. About *Blackfriars* junction I first heard the break whistle and then again just before reaching the *Waterloo* up home-signal, when the speed had been reduced to a walking pace. On first seeing the signals against us I rang the electric bell communicating with the front guard in the fourth vehicle from the engine. He answered me at once, and I could see fire flying from his break when I was near *Blackfriars* box. I could do no more. I was apprehensive that the driver would not stop, as the train was not pulling up as it ought. The speed was no faster than usual when I first saw the signals

at danger. I did not see the *Blackfriars* signalman as I passed the cabin, as I was looking out on the off side. On reaching *Charing Cross* the driver at once told me he had been unable to shut off steam. He said he thought he should have stopped had he been able to reverse the first time. I had felt the rebound of the train, when my van was about opposite the *Waterloo* distant signal. We were neither of us knocked down. I hardly felt the blow. No damage was done to my train. We were only delayed six minutes. I have often driven with *McMillen* before, and have never known him overrun any signals.

6. *William Howie*, locomotive inspector about three months, previously on the *Glasgow and South-Western Railway*.—I saw engine No. 104 on the 5th. The regulator was working properly, but would not completely shut off the steam. It went into the shops on the 9th for the examination of the regulator and handle. I have known of cases of regulators suddenly working stiffly, the valve being rough. Tallow would have the effect of easing the stiffness of the regulator. *McMillen* told me he had put some in.

7. *John Eden*, general foreman in the *Ashford* locomotive works, 14 years.—Mr. *Sterling* (the locomotive superintendent) and myself examined No. 104 engine when it arrived at *Ashford* on the 9th. The dome was lifted off in our presence. With the exception of a slight roughness on the surface of the small valve, which allowed of the escape of a small quantity of steam, the regulator and handle seemed to be both in capital condition. I got the steam up to 120 lbs., and found the escape of steam not sufficient to move the engine with everything shut. The engine left the works in January after a general overhaul, and if there is any sticking in the regulator it is generally the first day or two after the engine leaves the shops. In my experience I have not known a regulator suddenly work badly without some sufficient cause. The engine was sent back in two days after the surface of the small valve had been smoothed.

8. *Charles Jefferies*, signalman four years at *Blackfriars* box.—I was looking out of my window when the *Hastings* train passed. It was going very slowly, with steam shut off. I spoke to the driver, who had one hand on the reversing lever and the other on the moulding. He did not appear to be doing anything. The fireman was working at his break. I heard no break whistle at all. I thought the train had hardly speed enough to reach the *Waterloo* home-signals. The guard's breaks were on as they passed my cabin. I did not know anything of the collision till after it had happened.

Conclusion.

This collision between the up *Hastings* train and a train of empty carriages standing 60 yards inside the up home-signal at *Waterloo* junction station was caused by the inability of the driver of the *Hastings* train to stop, as he had fully intended to do, at or short of the home-signal, his excuse being that he could not close the regulator handle when he tried to do so before reaching *Blackfriars* cabin, and that the reversing-lever flew back when he tried to pull it over with the steam slightly on. On the engine being examined at the *Ashford* Works, a few days after the collision, a slight roughness was found upon the surface of the small valve of the steam-pipe, sufficient to allow of the escape of a small quantity of steam, though of not enough to move the engine.

It is probable, I think, that the driver may have been approaching *Waterloo* station rather faster than he ought to have done, and somewhat magnified the effects of the slight defect that existed in the working of the regulator. His previous conduct during a service of 24 years appears to have been very good.

The other servants of the company seem to have done their duty.

The block sections on this part of the line are necessarily very short, and the greatest possible care is consequently necessary in the working of the traffic; and that this care is as a rule exercised is shown by the rare occurrence of serious collisions.

This collision would not have occurred if the driver of the Hastings train had had control of a good continuous break.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on 21st November.

LONDON:
Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
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For Her Majesty's Stationery Office.

RAILWAY ACCIDENTS.

RETURNS

OF

ACCIDENTS AND CASUALTIES

AS REPORTED TO THE BOARD OF TRADE BY THE SEVERAL RAILWAY COMPANIES
IN THE UNITED KINGDOM,

During the Year ending 31st December 1878,

In pursuance of the Regulation of Railways Act (1871), 34 & 35 Vict. cap. 78;

TOGETHER WITH

REPORTS OF THE INSPECTING OFFICERS OF THE
RAILWAY DEPARTMENT TO THE BOARD OF TRADE

UPON

CERTAIN ACCIDENTS

Which were inquired into.

Presented to both Houses of Parliament by Command of Her Majesty.
13th February 1879.



LONDON:

PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

[C.—2261.] *Price 5s. 9d.*

1879.

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Summary of Accidents and Casualties which have been reported to the Board of Trade as having occurred upon the Railways in the United Kingdom, during the Year ending 31st December 1878.

I.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c.

Accidents to trains, rolling-stock, permanent-way, &c. caused the death of 39 persons and injury to 1,329, viz. :—

	Killed.	Injured.
Passengers	24	1,173
Servants of companies	15	156
Total	39	1,329

During the twelve months there were reported 53 collisions between passenger-trains or parts of passenger-trains, by which 13 passengers were killed, and 452 passengers and 14 servants were injured; 98 collisions between passenger-trains and goods or mineral-trains, engines, &c., by which 6 passengers and 1 servant were killed, and 537 passengers and 38 servants were injured; 28 collisions between goods-trains or parts of goods-trains, by which 5 servants were killed, and 30 were injured; 76 cases of passenger-trains or parts of passenger-trains leaving the rails, by which 5 passengers and 2 servants were killed, and 106 passengers and 7 servants were injured; 15 cases of goods-trains or parts of goods-trains leaving the rails, by which 7 servants were killed and 28 were injured; 16 cases of trains or engines travelling in the wrong direction through points, by which 13 passengers and 9 servants were injured; 20 cases of trains running into stations or sidings at too high a speed, by which 41 passengers and 3 servants were injured; 169 cases of trains running over cattle or other obstructions on the line, by which 3 passengers and 4 servants were injured; 10 cases of the bursting of boilers or tubes, &c. of engines, by which 14 servants were injured; 5 cases of the failure of machinery, &c. of engines, by which 1 servant was injured; the failure of 1,034 tyres, one of which caused injury to 1 servant; the failure of 540 axles, causing injury to 4 passengers and 4 servants; 16 cases of the failure of couplings, causing injury to 7 passengers and 2 servants; the fracture of 490 rails, causing injury to 8 passengers; and 8 accidents of a miscellaneous description, causing injury to 2 passengers and 1 servant.

There were also reported 57 cases of trains running through gates at level-crossings; the failure of 20 wheels, the failure of 6 tunnels, bridges, viaducts, &c.; 18 cases of the flooding of portions of the permanent-way; 19 cases of slips in cuttings or embankments; 7 cases of fires in trains, and 5 at stations; but in none of these was any personal injury involved.

Of the 1,034 tyres which failed, 83 were engine-tyres, 28 were tender-tyres, 14 were carriage-tyres, 45 were van-tyres, and 864 were wagon-tyres; of the wagons, 551 belonged to owners other than the railway companies; 783 tyres were made of iron, and 249 of steel, whilst in 2 cases the material was not stated; 65 tyres were fastened to their wheels by Gibson's patent method, 3 of which left their wheels when they failed; 32 were fastened by Beattie's patent, 2 of which left their wheels when they failed; and 6 by Mansell's patent, none of which left their wheels when they failed; 913 tyres were fastened to their wheels by bolts or rivets, 14 of which left their wheels when they failed; and 18 were secured by various other methods, 2 of which left their wheels when they failed; 115 tyres fractured at rivet-holes, 317 in the solid, 56 at the weld, and 544 split longitudinally or bulged, and of 2 the nature of the failure was not stated.

Of the 540 axles which failed, 287 were engine-axles, viz., 266 crank or driving, and 21 leading or trailing; 19 were tender-axles, 3 were carriage-axles, 221 were wagon-axles, and 10 were axles of salt-vans. 65 wagons and the salt-vans belonged to owners other than the railway companies. Of the crank or driving-axles, 204 were made of iron, and 61 of steel, and in 1 case the material was not stated; the average mileage of 192 of the iron axles was 172,917 miles, and of 55 of the steel axles 150,763 miles.

Of the 490 rails which were found fractured in the permanent-way, 377 were double-headed, 77 were single-headed, 15 were of Vignoles' section, 18 were bridge rails, and the form of the remaining 3 was not stated; 283 were made of iron, and 206 of steel, and in 1 case the material was not stated; of the double-headed rails, 214 had been turned,

II.—ACCIDENTS TO PASSENGERS FROM CAUSES OTHER THAN ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., INCLUDING ACCIDENTS FROM THEIR OWN WANT OF CAUTION OR MISCONDUCT; ACCIDENTS TO PERSONS PASSING OVER LEVEL-CROSSINGS; TRESPASSERS; AND OTHERS.

Of the 485 persons killed and 831 injured in this division, 101 of the killed and 579 of the injured were passengers. Of the latter 47 were killed and 104 injured by falling between carriages and platforms; 14 were killed and 355 injured by falling on to platforms, ballast, &c., when getting into or alighting from trains; 30 were killed and 19 injured whilst passing over the line at stations; 1 was killed and 42 were injured by the closing of carriage-doors; 3 were killed and 28 were injured by falling out of carriages during the travelling of trains; and 6 were killed and 31 injured from other causes. 48 persons were killed and 22 injured whilst passing over the line at level-crossings, viz., 33 killed and 17 injured at public level-crossings, 10 killed and 3 injured at occupation crossings, and 5 killed and 2 injured at foot-crossings. 238 persons were killed and 147 injured when trespassing on the railways. 60 persons committed suicide on railways. And of other persons not specifically classed, but mostly private people having business on the Companies' premises, 38 were killed and 83 injured.

III.—ACCIDENTS TO SERVANTS IN THE EMPLOY OF RAILWAY COMPANIES OR CONTRACTORS, CAUSED BY THE TRAVELLING OF TRAINS OR THE MOVEMENT OF VEHICLES USED EXCLUSIVELY UPON RAILWAYS.

During the twelve months there were 529 servants of companies or contractors reported as having been killed and 1,847 injured,* in addition to those included in Class I. Of these 44 were killed and 313 injured whilst coupling or uncoupling vehicles; 6 were killed and 44 injured by coming in contact, whilst riding on vehicles during shunting, with other vehicles, &c., standing on adjacent lines; 3 were killed and 39 injured whilst passing over or standing upon buffers during shunting; 36 were killed and 208 injured in getting on or off, or by falling off engines, wagons, &c. during shunting; 8 were killed and 129 injured whilst breaking, spragging, or chocking wheels; 8 were killed and 41 injured whilst attending to ground points, marshalling trains, &c.; 4 were killed and 99 injured whilst moving vehicles by capstans, turn-tables, props, &c., during shunting, and 15 were killed and 178 injured by various other accidents during shunting operations; 15 were killed and 44 injured by falling off engines, &c., during the travelling of trains; 9 were killed and 48 injured by coming in contact with over-bridges or erections on the sides of the line during the travelling of trains; 18 were killed and 43 injured whilst getting on or off engines, vans, &c. during the travelling of trains; 10 were killed and 75 injured whilst attending to, or by the failure of, machinery, &c. of engines in steam; 86 were killed and 126 injured whilst working on the permanent-way, sidings, &c.; 8 were killed and 1 was injured whilst attending to gates at level-crossings; 134 were killed and 173 injured whilst walking, crossing, or standing on the line on duty; 51 were killed and 147 injured by being caught between vehicles; 24 were killed and 86 injured by falling or being caught between trains and platforms, walls, &c.; 49 were killed and 8 injured whilst walking, &c. on the line on the way home or to work; and 1 was killed and 45 were injured from various other causes.

Altogether, the numbers of persons killed and injured on railways in the United Kingdom in the course of public traffic, during the twelve months ending 31st December 1878, as reported to the Board of Trade, were as follows:—

	Killed.	Injured.
Passengers :		
From accidents to trains, rolling-stock, permanent-way, &c.	24	1,173
By accidents from other causes - - -	101	579
Servants of companies or contractors :		
From accidents to trains, rolling stock, permanent-way, &c.	15	156
By accidents from other causes - - -	529	1,847
Persons passing over railways at level-crossings - - -	48	22
Trespassers (including suicides) - - -	298	147
Other persons not coming in above classification - -	38	83
Total - - - -	1,053	4,007

* For a classification of the injuries, see Table No. 6.

Note.—In addition to the above, the Railway Companies have reported to the Board of Trade, in pursuance of the 6th Section of the Regulation of Railways Act, 1871, the following accidents which occurred upon their premises, but in which the movement of vehicles used exclusively upon railways was not concerned, namely :—2 passengers killed and 80 injured whilst ascending or descending steps at stations; 29 injured by being struck by barrows, falling over packages, &c. on station platforms; 1 killed and 33 injured by falling off platforms; and 36 injured from other causes. Of servants of companies or contractors 3 were killed, and 419 injured whilst loading, unloading, or sheeting wagons; 138 were injured whilst moving or carrying goods in warehouses, &c.; 4 were killed and 92 injured whilst working at cranes or capstans; 3 were killed and 135 injured by the falling of wagon-doors, lamps, bales of goods, &c.; 4 were killed and 323 injured by falling off, or when getting on or off, stationary engines or vehicles; 7 were killed and 125 injured by falling off platforms, ladders, scaffolds, &c.; 145 were injured by stumbling whilst walking on the line or platforms; 1 was killed and 57 were injured whilst attending to stationary engines in sheds; 3 were killed and 43 injured by being trampled on or kicked by horses; 11 were killed and 181 injured whilst working on the line or in sidings; and 4 were killed and 137 injured from various other causes. 16 persons who were transacting business on the companies' premises were killed and 77 injured, making a total in this class of accidents of 59 persons killed and 2,050 injured.

Thus the total numbers of personal accidents reported to the Board of Trade by the several railway companies during the twelve months, amount to 1,112 persons killed and 6,057 injured.

TABLE No. 1.

GENERAL TOTAL.

NUMBER of PERSONS reported, during the Year ending 31st December 1878, as KILLED or INJURED on the Railways of the UNITED KINGDOM, distinguishing between PASSENGERS, SERVANTS of the COMPANIES or of CONTRACTORS, and OTHER PERSONS ; and distinguishing also in the case of the Two former Classes between ACCIDENTS caused by ACCIDENTS to TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., and ACCIDENTS happening otherwise.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
From accidents to trains, rolling-stock, permanent-way, &c. -	20	927	-	161	4	85	24	1,173
By accidents from other causes, including accidents from their own want of caution, or misconduct - - -	90	527	7	39	4	13	101	579
SERVANTS :—								
From accidents to trains, rolling-stock, permanent-way, &c. -	12	115	1	33	2	8	15	156
By accidents from other causes, including accidents from their own want of caution, or misconduct - - -	448	1,515	59	305	22	27	529	1,847
OTHER PERSONS :—								
Whilst passing over railways at level-crossings - -	41	21	4	-	3	1	48	22
Trespassers - - -	195	131	27	12	16	4	238	147
Suicides - - -	48	-	9	-	3	-	60	-
Miscellaneous, not included in either of the above - -	36	69	1	11	1	3	38	83
TOTAL - -	890	3,305	108	561	55	41	1,053	4,007

N.B.—The Board of Trade state the cause of accident as returned by the Companies, but do not guarantee or otherwise adopt the statement, except in cases where an official inquiry has been held.

TABLE No. 2.

NUMBER of PERSONS reported, during the Year ending 31st December 1878, as KILLED or INJURED in the UNITED KINGDOM by the TRAVELLING of TRAINS or the MOVEMENT of VEHICLES used exclusively upon Railways, distinguishing between PASSENGERS, SERVANTS of RAILWAY COMPANIES, and OTHER PERSONS, and classifying as far as practicable the Nature and Causes of the Accidents occasioning the Death or Injury.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
From accidents to trains, &c., <i>see Table No. 3.</i>	20	927	—	161	4	85	24	1,178
From falling between trains and platforms	42	87	8	14	2	8	47	104
From falling on to the platform, ballast, &c. when getting into or out of trains	13	332	1	16	—	7	14	355
Whilst crossing the line at stations	28	17	1	2	1	—	30	19
By the closing of carriage doors	1	42	—	—	—	—	1	42
From falling out of carriages during the travelling of trains	2	20	—	5	1	3	3	28
By other accidents	4	29	2	2	—	—	6	31
TOTAL	110	1,454	7	200	8	98	125	1,752
SERVANTS :—								
From accidents to trains, &c., <i>see Table No. 3.</i>	12	115	1	33	2	8	15	156
Whilst coupling or uncoupling vehicles	36	282	5	72	3	9	44	318
By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines	4	33	2	10	—	1	6	44
Whilst passing over or standing upon buffers during shunting	3	24	—	15	—	—	3	39
When getting on or off or falling off engines, waggons, &c., during shunting	25	165	9	40	2	3	36	208
Whilst breaking, spragging, or chocking wheels	7	109	—	19	1	1	8	129
Whilst attending to ground-points, marshalling trains, &c.	6	34	2	7	—	—	8	41
Whilst moving vehicles by capstans, turntables, props, &c., during shunting	2	85	2	13	—	1	4	99
By other accidents during shunting operations, not included in the preceding	13	147	2	29	—	2	15	178
From falling off engines, &c., during the travelling of trains	14	35	1	9	—	—	15	44
By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains	9	37	—	10	—	1	9	48
When getting on or off engines, vans, &c., during the travelling of trains	14	35	4	7	—	1	18	43
Whilst attending to, or by the failure of machinery, &c. of engines in steam	8	61	2	14	—	—	10	75
Whilst working on the permanent-way, sidings, &c.	72	111	8	13	6	2	86	126
Whilst attending to gates at level-crossings	8	1	—	—	—	—	8	1
Whilst walking, crossing, or standing on the line on duty	119	152	10	30	5	1	134	173
From being caught between vehicles	42	137	6	8	3	2	51	147
From falling or being caught between trains and platforms, walls, &c.	21	74	2	9	1	3	24	86
Whilst walking, &c., along the line on the way home or to work	44	7	4	1	1	—	49	8
Miscellaneous	1	36	—	9	—	—	1	45
TOTAL	460	1,630	60	338	24	35	544	2,003
OTHER PERSONS :—								
Whilst passing over railways at level crossings	41	21	4	—	3	1	48	22
Trespassers	195	131	27	12	16	4	238	147
Suicides	48	—	9	—	3	—	60	—
Miscellaneous	36	69	1	11	1	3	38	83
TOTAL	320	221	41	23	23	8	384	252
SUMMARY :—								
Passengers	110	1,454	7	200	8	98	125	1,752
Servants	460	1,630	60	338	24	35	544	2,003
Other persons	320	221	41	23	23	8	384	252
TOTAL ALL CLASSES	890	3,305	108	561	55	141	1,053	4,007

TABLE No. 3.

ACCIDENTS TO TRAINS, ROLLING STOCK, PERMANENT WAY, &c., reported, during the Year ending 31st December 1878, as having occurred on the RAILWAYS in the UNITED KINGDOM, distinguishing the different Classes of Accident, and the Number of Passengers and others, and of Servants of Railway Companies, KILLED or INJURED in each Class of Accident.

—	NUMBER OF CASES.				NUMBER OF PASSENGERS AND OTHERS.								NUMBER OF SERVANTS.							
	Eng-land and Wales.	Scot-land.	Ire-land.	United King- dom.	England and Wales.		Scotland.		Ireland.		United Kingdom.		England and Wales.		Scotland.		Ireland.		United Kingdom.	
					Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.
Collisions between passenger trains or parts of passenger trains - - -	44	7	2	58	13	340	-	108	-	4	18	452	-	18	-	-	-	1	-	14
Collisions between passenger trains and goods or mineral trains, engines, and vehicles standing foul of the line -	77	15	6	98	5	494	-	18	1	25	6	537	1	33	-	2	-	3	1	38
Collisions between goods trains or parts of goods trains -	20	5	3	28	-	-	-	-	-	-	-	-	4	23	1	5	-	2	5	30
Trains coming in contact with projections from other trains travelling on parallel lines -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Passenger trains or parts of passenger trains leaving the rails - - -	50	16	10	76	2	45	-	10	8	51	5	106	-	7	-	-	2	-	2	7
Goods trains or parts of goods trains, engines, &c. leaving the rails - - -	11	2	2	15	-	-	-	-	-	-	-	-	7	13	-	15	-	-	7	28
Trains or engines travelling in the wrong direction through points - - -	12	2	2	16	-	13	-	-	-	-	-	18	-	9	-	-	-	-	-	9
Trains running into stations or sidings at too high a speed - - -	18	6	1	20	-	22	-	19	-	-	-	41	-	3	-	-	-	-	-	3
Trains running over cattle or other obstructions on the line	146	28	-	169	-	3	-	-	-	-	-	3	-	1	-	3	-	-	-	4
Trains running through gates at level-crossings - -	56	1	-	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The bursting of boilers or tubes, &c. of engines -	7	1	2	10	-	-	-	-	-	-	-	-	-	10	-	4	-	-	-	14
The failure of machinery, springs, &c. of engines -	1	3	1	5	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
The failure of tyres - -	957	58	19	1,034	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
" " wheels -	17	2	1	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " axles -	450	73	17	540	-	4	-	-	-	-	-	4	-	1	-	3	-	-	-	4
" " break apparatus -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " couplings -	6	7	3	16	-	1	-	1	-	5	-	7	-	1	-	-	-	1	-	2
" " ropes used in working inclines -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " tunnels, bridges, viaducts, culverts, &c. -	2	4	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Broken rails - - -	300	189	1	490	-	8	-	5	-	-	-	8	-	-	-	-	-	-	-	-
The flooding of portions of permanent-way -	17	1	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ships in cuttings or embankments - - -	19	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire in trains - - -	3	4	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire at stations, or involving injury to bridges or viaducts	4	1	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other accidents - - -	4	3	1	8	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
TOTAL - - -	-	-	-	-	20	927	-	161	4	85	24	1,178	12	115	1	33	2	8	15	156

TABLE No. 4.

ACCIDENTS to TRAINS, ROLLING STOCK, PERMANENT WAY, &c. on the RAILWAYS in the UNITED KINGDOM, reported on which the same have occurred, and the Number of Passengers and others, and of Servants

NAME OF COMPANY.	Col- lisions between pas- senger trains or parts of pas- senger trains.	Col- lisions between pas- senger trains, and goods or mineral trains, engines, &c.	Col- lisions between goods trains or parts of goods trains.	Trains coming in contact with pro- jections from other trains travel- ling on parallel lines.	Pas- senger trains or parts of pas- senger trains leaving the rails.	Goods trains or parts of goods trains, &c. leaving the rails.	Trains or engines travel- ling in the wrong direction through points.	Trains running into stations or sidings at too high a speed.	Trains running over cattle or other obstruc- tions on the line.	Trains running through gates at level- cross- ings.	The bursting of boilers or tubes, &c. of engines.	The failure of ma- chinery, springs, &c. of engines.	The failure of tyres.
ENGLAND AND WALES.													
Aylesbury and Buckingham	-	-	-	-	1	-	-	-	-	-	-	-	-
Bishops Castle	-	-	-	-	1	-	-	-	-	-	-	-	-
Brecon and Merthyr	-	-	-	-	1	1	-	-	-	-	-	-	2
Cambrian	-	1	-	-	3	-	1	-	1	2	-	-	3
Carlisle Citadel Station	1	1	-	-	-	-	-	-	-	-	-	-	-
Cornwall	-	-	-	-	-	-	-	-	-	-	-	-	-
Festiniog	-	-	1	-	1	2	-	-	-	-	-	-	-
Furness	-	-	-	-	1	-	-	-	-	-	-	-	13
Great Eastern	5	9	1	-	2	-	-	-	22	30	-	-	19
Great Northern	1	3	1	-	2	1	-	-	3	1	-	-	5
Great Western	4	6	1	-	4	1	4	2	27	13	1	-	87
Isle of Wight	-	-	-	-	-	-	-	-	-	-	-	-	3
Lancashire and Yorkshire	5	13	4	-	6	1	1	5	18	1	1	1	19
London and North-Western	12	28	3	-	11	-	1	2	18	4	3	-	168
London and North-Western and Great Western Joint	1	-	-	-	1	1	-	-	1	-	-	-	-
London and South-Western	-	-	-	-	1	-	1	-	1	-	-	-	2
London, Brighton, and South Coast	2	2	-	-	2	-	-	2	1	-	-	-	12
London, Chatham, and Dover	-	1	-	-	-	-	-	1	-	-	-	-	5
Londonderry (Seaham to Sunderland)	-	-	-	-	1	-	-	-	-	-	-	-	-
London, Tilbury, and South- end	-	1	-	-	-	-	-	-	-	-	-	-	-
Manchester and Milford	-	-	-	-	-	1	-	-	-	-	-	-	-
Manchester, Sheffield and Lincolnshire	-	2	-	-	-	1	-	-	1	-	-	-	4
Maryport and Carlisle	-	-	1	-	-	-	-	-	-	-	-	-	1
Metropolitan	2	1	1	-	-	-	-	-	-	-	-	-	1
Metropolitan and St. John's Wood	1	-	-	-	-	-	-	-	-	-	-	-	-
Metropolitan District	1	-	-	-	4	-	1	-	-	-	-	-	-
Midland	-	5	1	-	-	-	1	-	-	-	-	-	18
Mid-Wales	-	-	-	-	-	-	-	-	1	-	-	-	2
Monmouthshire	-	-	-	-	1	-	-	-	17	1	-	-	-
Northampton and Banbury	-	-	-	-	-	-	-	-	1	-	-	-	-
North-Eastern	-	3	4	-	3	1	1	-	33	-	2	-	22
North London	3	-	-	-	-	-	-	-	-	-	-	-	-
North Staffordshire	-	1	-	-	-	-	-	-	-	-	-	-	20
North Wales Narrow Gauge	1	-	-	-	1	-	-	-	-	-	-	-	-
Oldham, Ashton-under- Lyne, and Guide Bridge Junction	-	-	-	-	-	-	-	-	-	-	-	-	-
Potteries, Shrewsbury, and North Wales	-	-	-	-	1	-	-	-	-	-	-	-	-
Preston and Wyre	1	-	-	-	-	-	-	-	1	1	-	-	-

TABLE No. 4.

during the Year ending 31st December 1878, distinguishing the different CLASSES of ACCIDENTS, the different RAILWAYS of Railway Companies, KILLED or INJURED on each Railway by those Accidents.

The failure of wheels.	The failure of axles.	The failure of break apparatus.	The failure of couplings.	The failure of ropes used in working inclines.	The failure of tunnels, bridges, viaducts, or culverts.	Broken rails.	The flooding of portions of permanent way.	Slips in cuttings or embankments.	Fire in trains.	Fire at stations or involving injury to bridges or viaducts.	Other accidents.	Number of Passengers and others.		Number of Servants.		Total all Classes.	
												Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	2	-	1	-	-	3	-	-	-	-	-	-	-	4	4	4	4
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	62	-	2	-	64
-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	26	-	-	-	-	23	11	3	1	2	-	-	100	-	6	-	106
-	14	-	-	-	-	24	-	-	-	-	-	-	25	-	9	-	34
-	81	-	-	-	-	31	3	7	1	-	1	-	45	1	6	1	51
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	22	-	2	-	-	20	-	-	-	2	-	-	26	1	13	1	39
-	52	-	1	-	-	-	2	3	-	-	2	-	104	1	22	1	126
-	-	-	-	-	-	4	-	-	-	-	-	2	15	-	9	2	24
-	9	-	-	-	-	30	-	1	-	-	-	-	9	-	-	-	9
-	21	-	1	-	-	21	-	-	-	-	-	-	253	-	-	-	253
1	10	-	-	-	-	50	-	-	-	-	-	5	85	-	1	5	86
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	22	-	-	-	-	10	-	-	-	-	-	-	12	1	5	1	17
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	3	-	19
-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	5
-	-	-	1	-	-	4	-	-	-	-	-	-	1	-	-	-	1
-	37	-	-	-	1	56	-	-	1	-	-	-	22	1	10	1	32
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	67	-	-	-	-	15	1	3	-	-	-	-	-	2	11	2	11
-	2	-	-	-	-	3	-	-	-	-	-	-	38	-	4	-	42
-	16	-	-	-	-	2	-	-	-	-	-	-	1	-	2	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	13

TABLE No. 4.—Number of Accidents to Trains,

NAME OF COMPANY.	Col- lisions between pas- senger trains or parts of pas- senger trains.	Col- lisions between pas- senger trains, and goods or mineral trains, &c.	Col- lisions between goods trains or parts of goods trains.	Trains coming in contact with pro- jections from other trains travel- ling on parallel lines.	Pas- senger trains or parts of pas- senger trains leaving the rails.	Goods trains or parts of goods trains, &c., leaving the rails.	Trains or engines travel- ling in the wrong direction through points.	Trains running into stations or sidings at too high a speed.	Trains running over cattle or other obstruc- tions on the line.	Trains running through gates at level- cross- ings.	The bursting of boilers or tubes, &c. of engines.	The failure of ma- chinery, springs, &c. of engines.	The failure of tyres.
ENGLAND AND WALES —continued.													
Rhymney - - -	-	-	2	-	-	1	-	-	-	-	-	-	-
Severn and Wye - -	-	-	-	-	-	-	1	-	-	-	-	-	-
Sheffield and Midland Com- mittee - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
Somerset and Dorset - -	-	-	-	-	-	-	-	-	-	-	-	-	-
South-Eastern - - -	3	-	-	-	2	-	-	1	-	1	-	-	-
Taff Vale - - -	1	-	-	-	-	-	-	-	-	-	-	-	-
Vale of Towy - - -	-	-	-	-	-	-	-	-	-	2	-	-	-
Whitehaven, Cleator, and Egremont - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
Private Owners - - -	-	-	-	-	-	-	-	-	-	-	-	-	551
TOTAL ENGLAND AND WALES - - -	44	77	20	-	50	11	12	13	146	56	7	1	957
SCOTLAND.													
Caledonian - - -	5	7	1	-	9	-	1	4	6	1	-	-	40
City of Glasgow Union - -	-	1	-	-	-	-	-	-	-	-	-	-	-
Glasgow and Paisley Joint	1	-	-	-	-	1	-	-	-	-	-	-	-
Glasgow and South-Western	-	3	1	-	-	-	-	-	1	-	-	-	5
Great North of Scotland - -	-	-	-	-	1	-	1	-	1	-	1	2	2
Highland - - -	-	-	-	-	2	-	-	-	15	-	-	-	-
North British - - -	1	4	3	-	4	1	-	2	-	-	-	1	11
Private Owners - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL SCOTLAND - - -	7	15	5	-	16	2	2	6	23	1	1	3	58
IRELAND.													
Ballymena and Larne - - -	-	-	-	-	2	-	-	-	-	-	-	-	-
Ballymena, Cushendall, and Red Bay - - -	-	-	-	-	-	-	-	-	-	-	-	-	2
Belfast and County Down - -	1	-	-	-	1	-	-	-	-	-	-	-	-
Belfast and Northern Counties	-	-	-	-	3	1	-	-	-	-	-	1	-
Cork and Bandon - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
Cork and Macroom - - -	-	-	-	-	1	-	-	-	-	-	-	-	-
Dublin, Wicklow, and Wex- ford - - -	-	1	1	-	-	-	1	-	-	-	-	-	-
Great Northern - - -	1	2	-	-	1	-	-	-	-	-	-	-	3
Great Southern and Western	-	-	2	-	1	-	-	-	-	-	-	-	2
Midland Great Western - - -	-	2	-	-	1	-	-	-	-	-	-	-	12
Newry and Armagh - - -	-	-	-	-	-	-	-	1	-	-	-	-	-
Newry, Warrenpoint, and Rostrevor - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
Waterford and Limerick - - -	-	1	-	-	-	1	-	-	-	-	2	-	-
Waterford and Tramore - - -	-	-	-	-	-	-	1	-	-	-	-	-	-
TOTAL IRELAND - - -	2	6	3	-	10	2	2	1	-	-	2	1	19
TOTAL UNITED KINGDOM	53	98	28	-	76	15	16	20	169	57	10	5	1,034

Rolling Stock, Permanent Way, &c.—continued.

The failure of wheels.	The failure of axles.	The failure of break apparatus.	The failure of couplings.	The failure of ropes used in working inclines.	The failure of tunnels, bridges, viaducts, or culverts.	Broken rails.	The flooding of portions of permanent way.	Slips in cuttings or embankments.	Fire in trains.	Fire at stations, or involving injury to bridges or viaducts.	Other accidents.	Number of Passengers and others.		Number of Servants.		Total all Classes.	
												Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	1	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	13	93	-	-	13	93
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	450	-	6	-	2	300	17	19	3	4	4	20	927	12	115	32	1,042
-	42	-	3	-	-	95	-	-	4	-	1	-	51	-	2	-	53
-	-	-	-	-	-	-	-	-	-	-	1	-	4	-	-	-	4
-	-	-	-	-	1	1	-	-	-	-	-	-	39	-	14	-	53
-	3	-	1	-	-	1	-	-	-	-	-	-	4	-	2	-	6
-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	5	-	13
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	19	-	3	-	3	92	1	-	-	1	1	-	55	1	10	1	65
-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	73	-	7	-	4	189	1	-	4	1	3	-	161	1	33	1	194
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	3
-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	3	50	2	-	5	50
-	1	-	1	-	-	-	-	-	-	-	-	1	15	-	2	1	17
-	4	-	1	-	-	-	-	-	-	-	-	-	16	-	3	-	19
-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
1	6	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	17	-	3	-	-	1	-	-	-	-	1	4	85	2	8	6	93
20	540	-	16	-	6	490	18	19	7	5	8	24	1,173	15	156	39	2,329

TABLE No. 5.

NUMBER of SERVANTS of RAILWAY COMPANIES and CONTRACTORS reported, during the Year ending 31st December 1878, exclusively upon Railways, distinguishing the Number which have occurred on each Railway or System of Railway,

NAME OF COMPANY.	From accidents to trains, &c. See Table No. 4.		Whilst coupling or uncoupling vehicles.		By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines.		Whilst passing over, or standing upon, buffers during shunting.		When getting on or off, or falling off engines, wagons, &c., during shunting.		Whilst breaking, spragging, or chocking wheels.		Whilst attending to ground-points, marshalling trains, &c.		Whilst moving vehicles by capstans, turn-tables, props, &c., during shunting.		By other accidents during shunting operations, not included in the preceding.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
ENGLAND AND WALES.																		
Brecon and Merthyr - - -	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cambrian - - -	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Carmarthen and Cardigan - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carlisle Citadel Station - -	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cheshire Lines - - -	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Cornwall - - -	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
Festiniog - - -	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Furness - - -	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Great Eastern - - -	-	6	4	13	-	2	1	3	1	8	-	7	-	-	-	5	-	14
Great Northern - - -	-	9	2	18	-	4	-	-	-	11	-	1	1	3	-	-	2	9
Great Western - - -	1	6	4	46	1	5	1	7	5	29	3	14	-	4	-	7	1	12
Lancashire and Yorkshire - -	1	13	6	28	1	5	-	3	2	25	-	24	1	8	-	20	-	29
London and North-Western - -	1	22	4	48	1	5	1	4	6	32	2	21	1	7	2	38	-	26
London and North-Western and Great Western Joint - - -	-	9	-	7	-	2	-	-	-	4	-	1	1	-	-	-	1	2
London and South-Western - -	-	-	1	1	-	-	-	-	2	-	-	-	1	-	-	-	-	-
London, Brighton, and South Coast -	-	-	3	3	-	-	-	-	3	4	-	4	-	1	-	1	2	7
London, Chatham, and Dover - -	-	1	-	1	-	1	-	-	-	1	-	-	-	-	-	5	-	2
London, Tilbury, and Southend - -	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manchester, Sheffield, and Lincolnshire	1	5	1	9	-	3	-	2	1	7	-	10	-	1	-	2	1	8
Maryport and Carlisle - - -	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Metropolitan - - -	-	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Metropolitan and St. John's Wood -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metropolitan District - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Midland - - -	1	10	4	22	-	4	-	2	3	21	-	7	2	4	-	-	3	13
Midland and Great Western Joint -	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Monmouthshire - - -	-	-	-	2	-	-	-	1	-	2	-	3	-	-	-	-	-	-
North-Eastern - - -	2	11	3	23	1	2	-	2	2	14	1	10	-	3	-	7	3	22
North London - - -	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Staffordshire - - -	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Union - - -	-	-	-	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-
North Wales Narrow Gauge - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oldham, Ashton-under-Lyne, and Guide Bridge Junction - -	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Preston and Longridge - - -	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE No. 5.

as KILLED or INJURED in the UNITED KINGDOM by the TRAVELLING of TRAINS or the MOVEMENT of VEHICLES used and classifying as far as practicable the Nature and Causes of the Accidents occasioning the Death or Injury.

From falling off engines, &c., during the travelling of trains.		By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains.		When getting on or off engines, vans, &c., during the travelling of trains.		Whilst attending to, or by the failure of, machinery, &c., of engines in steam.		Whilst working on the permanent way, sidings, &c.		Whilst attending to gates at level-crossings.		Whilst walking, crossing, or standing on the line on duty.		From being caught between vehicles.		From falling or being caught between trains and platforms, walls, &c.		Whilst walking, &c., on the line on the way home, or to work.		Miscellaneous.		TOTAL.	
Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	1	-	-	1	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	6	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	1	4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	2	2
-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	6
1	2	-	-	1	-	1	-	3	14	2	-	3	10	-	7	-	5	2	-	5	19	101	
-	3	-	2	1	1	1	4	6	8	-	-	10	5	2	9	-	3	1	-	1	26	91	
-	7	2	9	1	8	2	11	7	20	2	-	21	28	6	20	1	15	8	2	9	66	259	
3	4	-	5	-	4	1	24	4	7	-	-	8	19	5	25	-	7	2	2	6	34	258	
2	4	-	5	7	7	1	12	11	15	1	1	30	36	9	28	5	17	12	-	5	96	333	
-	1	-	-	-	-	-	-	1	1	-	-	-	2	1	3	1	-	1	-	1	6	33	
1	2	2	-	1	-	-	-	6	1	2	-	3	6	2	4	1	1	2	-	-	23	16	
-	-	-	2	-	1	-	-	4	7	-	-	5	4	3	2	1	2	2	-	2	23	40	
1	-	2	-	-	-	-	-	4	4	-	-	-	6	-	3	-	-	-	-	2	7	26	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	
-	-	-	1	-	3	-	-	3	1	-	-	3	5	2	2	-	6	-	-	-	12	65	
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
-	1	-	-	-	1	-	1	-	1	-	-	-	3	-	-	-	3	-	-	-	-	16	
-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	
-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	2	-	
-	5	1	3	-	3	-	-	9	15	1	-	19	15	5	23	4	4	6	3	-	58	154	
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1	
-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	11	
3	3	2	5	1	6	-	8	4	8	-	-	11	6	2	8	4	6	5	-	2	44	146	
-	-	-	-	1	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	3	7	
1	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	5	2	
-	-	-	-	-	-	1	-	1	-	-	-	-	1	-	-	-	-	-	-	1	2	5	
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	

TABLE No. 5.—Number of Servants reported

NAME OF COMPANY.	From acci- dents to trains, &c. See Table No. 4.		Whilst coupling or uncoupling vehicles.		By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines.		Whilst passing over, or standing upon buffers during shunting.		When getting on or off, or falling off, engines, waggons, &c. during shunting.		Whilst breaking, spragging, or chocking wheels.		Whilst attending to ground- points, marshalling trains, &c.		Whilst moving vehicles by capstans, turn-tables, props, &c. during shunting.		By other accidents during shunting operations not included in the preceding.	
	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.	Killed.	In- jured.
ENGLAND AND WALES—cont.																		
Preston and Wyre - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhymney - - - - -	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhymney and Great Western (Bargoed Joint) - - - - -	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Byde and Newport, and Cowes and Newport Joint - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Severn and Wye - - - -	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sheffield and Midland Committee -	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-
Somerset and Dorset - - - -	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
South-Eastern - - - - -	-	-	-	2	-	-	-	-	2	-	-	-	1	-	-	-	-	-
Taff Vale - - - - -	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Yarmouth and North Norfolk - -	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL, ENGLAND AND WALES -	12	115	36	232	4	33	3	24	25	165	7	109	6	34	2	85	13	147
SCOTLAND.																		
Caledonian - - - - -	-	2	-	19	-	4	-	2	5	16	-	7	1	2	-	5	1	6
Glasgow and Paisley Joint - - -	-	14	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2
Glasgow and South-Western - - -	-	2	1	7	-	-	-	3	-	2	-	2	1	1	-	2	-	3
Glasgow, Barrhead, and Kilmarnock Joint - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Great North of Scotland - - - -	-	5	-	2	-	2	-	-	1	-	-	-	-	-	-	1	-	1
Highland - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
North British - - - - -	1	10	4	44	2	4	-	10	3	22	-	10	-	3	2	5	1	14
Sutherland and Caithness - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
TOTAL, SCOTLAND - - - -	1	33	5	72	2	10	-	15	9	40	-	19	2	7	2	13	2	29
IRELAND.																		
Ballymena and Larne - - - -	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Belfast and County Down - - -	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Belfast and Northern Counties -	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	2
Cork and Macroom - - - - -	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin, Wicklow, and Wexford -	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Great Northern of Ireland - - -	-	3	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Great Southern and Western - -	-	1	-	4	-	-	-	1	1	-	1	-	-	-	-	-	-	-
Midland Great Western - - - -	-	1	2	1	-	1	-	-	1	-	-	-	-	-	-	1	-	-
Waterford and Limerick - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL, IRELAND - - - -	2	8	3	9	-	1	-	-	2	3	1	1	-	-	-	1	-	2
TOTAL, UNITED KINGDOM -	15	156	44	313	6	44	3	39	36	208	8	129	8	41	4	99	15	178

as Killed or Injured, &c.—*continued.*

From falling off engines, &c., during the travelling of trains.		By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains.		When getting on or off engines, vans, &c., during the travelling of trains.		Whilst attending to, or by the failure of, machinery, &c., of engines in steam.		Whilst working on the permanent way, sidings, &c.		Whilst attending to gates at level crossings.		Whilst walking, crossing, or standing on the line on duty.		From being caught between vehicles.		From falling or being caught between trains and platforms, walls, &c.		Whilst walking, &c., on the line on the way home or to work.		Miscellaneous.		TOTAL.	
Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	2
-	1	-	-	-	1	-	-	5	-	-	-	3	3	2	-	1	2	2	-	1	-	14	12
-	-	-	-	1	-	-	-	2	-	-	-	1	-	1	-	-	1	-	-	-	-	3	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
14	35	9	37	14	35	8	61	72	111	8	1	119	152	42	137	21	74	44	7	1	36	460	1,630
-	3	-	5	2	2	1	2	4	9	-	-	5	6	3	4	1	2	2	1	-	4	25	101
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	19
-	1	-	1	1	1	-	-	1	-	-	-	-	2	-	2	-	1	1	-	-	-	5	30
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	12
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1	5	-	2	1	4	1	12	3	4	-	-	5	11	3	2	1	6	1	-	-	4	29	172
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1	9	-	10	4	7	2	14	8	13	-	-	10	20	6	8	2	9	4	1	-	9	60	338
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-
-	-	-	1	-	1	-	-	1	-	-	-	3	-	2	1	-	1	-	-	-	8	8	-
-	-	-	-	-	-	-	-	-	1	-	-	2	1	1	-	-	1	-	-	-	4	10	-
-	-	-	-	-	-	-	-	3	1	-	-	-	-	-	1	1	1	-	-	-	6	8	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-
-	-	-	1	-	1	-	-	6	2	-	-	5	1	3	2	1	3	1	-	-	-	24	35
15	44	9	48	18	43	10	75	86	126	8	1	134	173	51	147	24	86	49	8	1	45	544	2,003

TABLE No. 6.

TABLE showing the different OCCUPATIONS of SERVANTS of RAILWAY COMPANIES and CONTRACTORS who were KILLED and INJURED during the Year ending 31st December 1878, and classifying their INJURIES as far as practicable.

CLASS OF SERVICE.	Fatal.	Amputations.			Fractures.		Dis-locations.	Crushes.			Scalds.	Sprains, Cuts, or Bruises.	Severe.	Shaken.	Slight.	Unspecified Injuries to				Miscellaneous.	Total Injured.
		Legs or Arms.	Feet or Hands.	Toes or Fingers.	Legs or Arms.	Collar-bones or Ribs.		Legs or Arms.	Feet or Hands.	Body.						Head.	Body.	Legs or Arms.	Feet or Hands.		
Breaksmen and Goods-guards	47	10	3	8	15	8	4	22	50	23	-	122	7	10	31	8	21	25	28	1	396
Capstanmen	1	-	-	-	1	-	-	-	2	1	-	3	-	-	1	-	1	1	2	-	12
Carmen	1	1	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	3
Carriage-cleaners	9	-	-	1	-	2	-	-	4	4	-	4	1	1	1	1	1	1	-	-	21
Carriage or Waggon examiners	3	3	-	-	-	-	-	-	-	1	-	3	-	-	-	-	-	1	-	-	8
Checkers	1	-	-	-	-	2	-	-	2	2	-	1	-	-	-	-	-	1	-	-	8
Chockers, Chain-boys, and Slip-pers	5	-	-	2	3	-	-	3	7	1	-	8	-	-	2	-	1	2	4	-	33
Clerks	7	1	-	-	1	-	-	-	3	-	-	2	-	-	-	-	2	-	-	-	9
Engine-cleaners	12	-	1	1	1	-	-	1	9	1	-	5	1	-	1	-	2	1	3	1	28
Engine-drivers	19	1	3	2	6	-	1	2	4	3	11	36	14	14	9	8	4	6	4	2	130
Firemen	24	4	3	2	3	5	-	3	9	6	12	44	16	15	23	15	5	6	12	2	185
Gatekeepers	12	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	1	-	-	3
Greasers	7	-	-	1	-	-	-	-	2	2	-	-	1	-	-	-	-	-	1	-	7
Guards, Passenger	8	-	-	-	4	-	-	-	1	4	-	22	7	17	6	5	1	4	-	-	71
Horse-drivers	16	-	-	2	5	1	1	1	11	13	-	10	5	2	1	-	2	4	5	1	64
Inspectors	8	-	-	-	1	1	-	-	3	2	-	3	1	2	4	-	1	-	-	-	18
Labourers	38	2	-	-	2	-	-	2	6	2	-	17	3	7	9	3	3	3	-	1	60
Lampmen	3	-	1	-	-	-	-	-	1	1	-	2	-	-	1	2	1	1	1	1	12
Loaders and Sheeters	2	-	-	-	-	1	-	-	1	3	-	2	-	1	-	-	-	-	1	-	9
Mechanics	22	-	-	-	4	-	-	1	-	1	-	6	1	-	1	1	3	3	-	-	21
Messengers	1	-	-	-	-	1	-	1	1	1	-	2	1	-	-	1	-	-	-	-	8
Number-takers	3	-	-	2	1	-	-	-	3	3	-	1	1	1	1	-	-	1	1	-	15
Permanent-way Men	127	6	-	2	9	4	1	8	10	7	-	38	15	14	21	13	7	12	3	-	170
Pointsmen	11	-	-	-	2	-	1	1	7	-	-	7	-	3	2	-	2	1	-	-	26
Policemen	-	-	-	-	-	-	-	2	-	-	-	1	-	-	1	-	-	-	-	-	4
Porters	63	8	2	5	16	7	3	8	47	35	-	99	19	14	26	11	14	22	16	1	353
Shunters	45	4	4	1	12	3	1	12	32	15	-	44	11	8	19	7	4	16	19	1	213
Signal-fitters	2	-	-	1	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	3
Signalmen	13	1	-	-	-	2	-	1	2	1	-	13	1	-	-	1	-	1	1	-	24
Station Masters	3	-	-	-	-	-	-	1	-	-	-	1	1	-	1	-	1	-	1	-	6
Ticket-collectors	2	1	-	-	1	-	-	-	-	-	-	-	1	-	-	-	1	-	1	-	5
Watchmen	5	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	1	-	4
Yardsmen	3	2	-	2	4	-	1	1	3	1	-	12	1	-	-	2	-	1	1	-	31
Miscellaneous	6	2	-	-	-	1	-	-	1	-	-	2	1	1	2	1	1	4	2	-	18
Contractors' Servants.	13	1	-	-	4	-	-	1	1	4	-	6	2	1	2	1	1	1	-	-	25
TOTAL	544	47	17	32	96	38	13	72	222	137	23	521	113	111	165	80	79	119	107	11	2,008

TABLE No. 7.

NUMBER of PERSONS reported during the Year ending 31st December 1878, as having been KILLED or INJURED, whilst upon the Companies' Premises, by Accidents in which the Movement of Vehicles used exclusively upon Railways was not concerned, distinguishing between Passengers, Servants of Companies, and other Persons, and classifying, as far as practicable, the Nature and Causes of the Accidents occasioning the Death or Injury.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
Whilst ascending or descending steps at stations - - - -	2	80	—	—	—	—	2	80
By being struck by barrows, by falling over packages, &c. on station platforms -	—	27	—	1	—	1	—	29
From falling off platforms - - -	1	32	—	1	—	—	1	33
By other accidents - - - -	—	36	—	—	—	—	—	36
TOTAL - - - -	3	175	—	2	—	1	3	178
SERVANTS :—								
Whilst loading, unloading, or sheeting waggons - - - -	3	398	—	19	—	2	3	419
Whilst moving or carrying goods in warehouses, &c. - - - -	—	138	—	—	—	—	—	138
Whilst working at cranes or capstans -	4	89	—	3	—	—	4	92
By the falling of waggon-doors, lamps, bales of goods, &c. - - - -	3	126	—	8	—	1	3	135
From falling off, or when getting on or off, stationary engines or vehicles -	2	282	2	36	—	5	4	323
From falling off platforms, ladders, scaffolds, &c. - - - -	7	121	—	4	—	—	7	125
By stumbling whilst walking on the line or platforms - - - -	—	142	—	2	—	1	—	145
Whilst attending to stationary engines in sheds - - - -	1	56	—	1	—	—	1	57
By being trampled on or kicked by horses	2	43	1	—	—	—	3	43
Whilst working on the line or in sidings	9	175	2	6	—	—	11	181
Miscellaneous - - - -	8	180	1	7	—	—	4	137
TOTAL - - - -	34	1,700	6	86	—	9	40	1,795
PERSONS ON BUSINESS AT STATIONS -	12	72	4	4	—	1	16	77
SUMMARY :—								
Passengers - - - -	3	175	—	2	—	1	3	178
Servants - - - -	34	1,700	6	86	—	9	40	1,795
Persons on business at stations - -	12	72	4	4	—	1	16	77
TOTAL ALL CLASSES -	49	1,947	10	92	—	11	59	2,050

TABLE No. 8.

COMPARATIVE TABLE for the YEARS 1876, 1877, and 1878.

NUMBER OF PERSONS REPORTED AS HAVING BEEN KILLED OR INJURED BY THE TRAVELLING OF TRAINS OR THE MOVEMENT OF VEHICLES USED EXCLUSIVELY UPON RAILWAYS.															NUMBER OF PERSONS REPORTED AS HAVING BEEN KILLED OR INJURED, WHILST UPON THE COMPANIES PREMISES, BY ACCIDENTS, IN WHICH THE MOVEMENT OF VEHICLES USED EXCLUSIVELY UPON RAILWAYS WAS NOT CONCERNED.																																							
															PASSENGERS.					SERVANTS.					OTHER PERSONS.					TOTAL.					Persons on business at stations.																			
															By accidents from other causes, including accidents from their own want of caution or misconduct.					From accidents to trains, rolling stock, permanent way, &c.					By accidents from other causes, including accidents from their own want of caution or misconduct.					Whilst passing over railways at level-crossings.					Trespassers.					Sui-cides. in preceding columns.					Miscellaneous not included in preceding columns.					TOTAL.				
															Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.						
ENGLAND AND WALES	1876	35	1,044	95	596	22	190	527	2,076	53	26	210	112	43	51	67	1,086	4,111	5	71	21	1,246	11	36	37	1,353																												
	1877	10	609	99	572	20	180	505	1,684	61	29	192	118	39	33	69	959	3,206	6	161	36	1,751	4	53	46	1,965																												
	1878	20	927	90	527	12	115	448	1,515	41	21	195	131	48	36	69	890	3,305	3	175	34	1,700	12	72	49	1,947																												
SCOTLAND	1876	—	183	4	35	5	33	101	266	3	4	40	17	5	15	8	173	546	—	3	1	23	2	4	3	30																												
	1877	—	19	14	39	2	21	94	305	3	4	45	22	2	9	12	169	422	—	—	5	35	—	2	5	37																												
	1878	—	161	7	39	1	33	59	305	4	—	27	12	9	1	11	108	561	—	2	6	86	4	4	10	92																												
IRELAND	1876	1	18	4	7	1	12	17	22	3	—	7	5	—	3	2	36	67	—	—	1	3	—	2	1	5																												
	1877	1	36	2	8	—	3	21	20	4	—	17	6	—	2	4	47	77	—	1	1	5	—	—	1	6																												
	1878	4	85	4	13	2	8	22	27	3	1	16	4	3	1	3	55	141	—	1	—	9	—	1	—	11																												
UNITED KINGDOM	1876	36	1,245	103	638	28	236	645	2,364	59	30	237	134	48	69	77	1,245	4,724	5	74	23	1,272	13	42	41	1,388																												
	1877	11	664	115	619	22	154	620	2,009	68	33	254	141	41	44	85	1,175	3,705	6	162	42	1,791	4	55	52	2,008																												
	1878	24	1,173	101	579	15	156	529	1,847	48	22	238	147	60	38	83	1,053	4,007	3	178	40	1,795	16	77	59	2,050																												

REPORTS TO THE BOARD OF TRADE UPON ACCIDENTS INQUIRED INTO BY THE INSPECTING OFFICERS OF THE RAILWAY DEPARTMENT.

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BELFAST AND COUNTY DOWN RAILWAY.

SIR, Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 30th November 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 11th instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 29th ultimo, at Newtownards, on the Belfast and County Down Railway.

In this case the 7.20 p.m. up passenger train from Donaghadee for Belfast, due at Newtownards at 7.41 p.m., came into collision with the 6.30 p.m. down train from Belfast for Donaghadee, due at Newtownards (where it crosses the up passenger train) at 7.14 p.m. The down train was a mixed passenger and goods train as far as Newtownards, and thence to Donaghadee only a goods train.

Two passengers in the up train complained at the time of having been shaken, but nothing has since been heard of them.

The guard of the up train was also shaken.

The front buffers of each engine and the headstock of one were damaged, and the body of one carriage was shifted on its frame.

No vehicles were thrown off the rails.

Description.

The Belfast and County Down Railway is a single line worked with the train staff and ticket, Newtownards being a staff station and passing place. Although there is a loop line at this station, there is only one platform, viz., on the up loop line, and consequently the first train to arrive of two trains (which have to cross) has, after discharging its passengers, to either draw ahead from the platform and set back into the loop line, or vice versa.

The station is provided with home and distant signals not interlocked with the points. The only signals to which it is necessary here to refer are the up distant and up home signals. The up distant signal is placed on a high post, and this is again on the top of the side of a deep cutting. It is first visible about half a mile off, after which it is lost sight of for a short distance, and is 190 yards distant from the loop points at the down end of the station; the up home-signal is on the platform 380 yards from the up distant-signal, and visible for about 340 yards. The collision occurred on the single line 125 yards inside the up-distant signal, 65 yards outside the loop points, through which the mixed train was about to set back. The line falls from Donaghadee towards Newtownards on a gradient of 1 in 100, is flatter through the station, after which it again falls on the same gradient towards Belfast. Owing to a curve, a cutting and an over-bridge, the view of the entrance to the down end of the station is very limited. In the present case it was not possible for the driver of the up train to see the engine of the down train for a greater distance than about 140 yards.

Evidence.

1. *John Gaynor*, station-master at Newtownards two years, previously 11 years at Comber in the same position.—I was on duty when the down mixed train arrived at 7.40 p.m. It discharged its passengers and then drew ahead to set back through the far points into the loop line to allow of the up train passing. Nothing had been heard here, either by telegraph or whistling of the up train when the down train left the platform. The line is worked with the staff and ticket, this being a staff station. The up signals were at danger to protect the down train when it drew out. The night was misty, and I could not see the back light of the distant-signal, but I know the lever was in the position of danger, as I was standing beside it. It had been last taken off to admit the 5.5 p.m. train from Donaghadee. Beside being misty, it was snowing, and blowing hard. Before the collision I heard the engine of the down train giving the alarm whistle, and immediately after-

wards came the collision. I got up to the spot at once. There were no wheels off the rails. I looked at the distant-signal at once, and underneath it, and some perches beyond it (about 15 or 20 yards), it showed a red light, but beyond this for some distance further it showed a white light. The driver of the up train said it had been an "all right" signal. It occasionally happens that this up train is stopped on account of the shunting of the down train. I had told the guard of the train to get it into the loop by the points at the Belfast end of the station, but he disobeyed my orders. I was on the platform when the train went ahead, and I sent porter Quinliven to try and stop the driver, but he could not overtake him; and as he could not be stopped, I went up to the signal levers which were in the position of danger. It was more difficult to get the train into the loop by the points at the Belfast end than by those at the other end, on account of the gradient.

The guard told me afterwards he did not understand me, and he was not sure whether he told the driver to come back or go ahead. The driver said the guard gave him a signal to go ahead. The collision occurred about 7.40, just as the up train was due.

2. *John Rice*, porter nearly 17 years at Newtownards.—I put the up distant-signal to danger after the arrival of the up train at 5.30. To my knowledge it was never altered after this. I saw the back light of this signal shortly before the arrival of the 7.20 up train, and though it was very dim I took it for green, showing that it was at danger, but it was very dim and I might have been mistaken. I heard the station-master give orders about unlocking the points at the Belfast end of the loop to get the goods train in that way. I saw the train going a head, and saw Quinliven running his best to overtake the driver. I seldom remember the 7.20 up train having been stopped in this way.

3. *John Quinliven*, porter at Newtownards four years.—The station-master told me that the 6.30 train was to shunt through the points at the Comber end, and to see that the points were ready. I placed a man at these points. On the train starting to go towards Donaghadee the station-master told me to run after the driver and bring him back, but he was going too fast, and I could not overtake him, though I ran to the end of the platform. The points at the Donaghadee end of the station were unlocked and attended to by Porter Kerlin.

4. *Richard Kirkham*, driver 16 years.—I started from Belfast with the 6.30 p.m. mixed train for Newtownards to proceed thence as a goods train to Donaghadee. We left at 6.54 p.m., the goods waggons not being ready. We last stopped at Comber and, left it with a load of 10 waggons next the engine, and two carriages and a third-class break behind the waggons. We reached Newtownards at 7.40. We stopped at the platform to discharge the passengers, and then I got a signal to go ahead from the goods guard, both by his lamp and by word of mouth, and I accordingly proceeded as far as the over-bridge, having, on passing the points, been told by Porter Kerlin that the up passenger train was whistling. I consequently stopped as soon as I could, and at once set back, and was on the move when the other engine ran into mine. My speed was about three or four miles an hour; that of the other train faster. On seeing the other train, I was afraid it was coming too fast, and whistled to draw the driver's attention. We neither of us jumped off. I was a little hurt in the thigh, but was not off duty. I did not notice what the back light of the distant-signal was showing. The night was wild, sleeting, and blowing. I knew the up passenger train was due, but it did not strike me it was dangerous to run out in the face of it. On previous occasions I have always gone forward and backed through the points, but have never been so late as this at other times. I should not have had any difficulty in setting back and going into the siding through the points at the Comber end had the guard instructed me to do so, and I performed this operation after the collision without any particular difficulty. I noticed no man standing at the Comber end of the loop when I came in. The same night, on my return to Newtownards from Donaghadee, the lamp of the distant-signal was showing "all right," and the arm was down. After finishing the shunting, and hearing from Mr. Gaynor that the distant-signal was not working properly, I took him on the engine some distance to the Donaghadee side of the distant-signal, which was off when we passed it going down. I then, as agreed with the signaller, whistled for it to be turned to danger, and we could then just discern it showing a little red, but more white, and on coming closer to it it showed all white, although the arm was properly at danger. I did not find out the cause of it. I have been stopped by this

signal on previous occasions, and have always known it to work properly. My engine had on a white head light and my mate held out a red gauge glass lamp against the incoming train.

5. *Thomas Morrow*, guard seven years.—I was in charge of the 6.30 p.m. mixed train from Belfast. We left at 6.54, having been detained by various causes. We left Comber at 7.28, 29 minutes late, with a load of 10 waggons and three carriages. We reached Newtownards at 7.41, 27 minutes late, and took about two minutes to discharge passengers. The station-master told me to hurry and get the main-line clear, but without telling me whether to go forwards or backwards, the practice being to go forward and set back. I knew the passenger train was due, but it did not strike me it was dangerous to go forward, thinking that the distant-signal would protect my train. I shouted to the driver "right," but gave him no signal with the hand-lamp, which was not in my hand at the time. I saw no one run after the driver to try and stop him. When the collision happened I was in the van. It was a slight shock. We were setting back at the time, but had not got over the points. We afterwards got into the loop by the points at the Comber end. The station-master was standing beside me when I shouted to the driver "right." The points at the Comber end of the stations are used with this train almost every night for the engine to run round its train.

6. *Joseph Hulse*, driver seven years with the Belfast and County Down Railway.—I started from Donaghadee with the 7.20 p.m. up passenger train for Belfast. The train consisted of engine and tender, running engine first, three carriages and a van. We last stopped at Groomsport Road station, and left it at about 7.32, two minutes late, it being $4\frac{1}{4}$ miles thence to Newtownards. The night was very coarse; the wind blowing about north-east, with snow and sleet. On first sighting the distant-signal, more than a quarter of a mile off, it was showing a clear white light. My steam was shut off, and had been so for about $1\frac{1}{2}$ miles back from the station, and my speed was not more than 15 miles an hour. I kept the signal in view till I came to it, and it continued to show clear all the way. On passing it the speed did not exceed seven miles an hour, and I then saw the smoke and heard the beat of an engine, upon which I reversed my engine, opened the regulator, and whistled for the breaks. I saw no head light on the engine, but when about 20 yards from it, I got a red hand-light from the footplate. I heard no whistle from the other engine. The speed on collision was about six miles an hour. We were neither of us hurt, nor did we jump off. No wheels left the rails. Two or three minutes after the collision, on looking back at the signal from the bridge, I saw the back light showing white, and called my guard's attention to this. I told the station-master that the distant-signal was standing at "all right." I have frequently run this train for the last seven years, but during the last 18 months have never been stopped outside Newtownards by the 6.30 down train.

7. *James Conway*, guard 12 years.—I started from Donaghadee about 7.21, a minute late, with the up passenger train for Belfast. It consisted of a van and three carriages. We lost two minutes up to Groomsport, the rails being slippery, and left it three minutes late. I put my break on before the driver whistled for the signals at Newtownards, about a mile from the station, and took it off as soon as the speed was reduced to about five miles an hour, about 100 or 150 yards outside the distant-signal. I did not see the distant-signal myself, but hearing the driver give the usual signal-whistle, and then cease whistling, I knew all was right. On hearing the break-whistle given from the engine just by the overbridge, I concluded something was wrong, or the home-signal at danger, and I in consequence at once applied my break, and

got it on two or three turns when the collision occurred, the speed being then very slow. I was knocked down, but not hurt so as to have to leave duty. After the collision the driver drew my attention to the back light of the distant-signal from near the bridge, and I saw it was showing a clear white light. It is a good while ago since I was stopped by this signal.

The general manager informed me that on the day following that of the collision he went down to Newtownards by daylight, and it occurred to him, while looking at the distant-signal, that the light

would show outside the spectacle; that he accordingly came up from Donaghadee by the 7.20 p.m. train, and on coming in sight of the signal he found that it showed a bright white light; that he then lost sight of it, and that on its again coming into view it was white, and about 200 yards from it a dull white, and then again, when nearer to it, white; that he then stood at the signal and saw that the arm was standing at danger, which he had arranged should be the case; that it was then taken off in answer to the engine-driver whistling; that he then suggested having the spectacle enlarged.

Conclusion.

This collision,—in which an up passenger train consisting of engine, tender, three carriages, and a break-van ran into a down mixed train consisting of engine, tender, 10 waggons, two carriages, and a break carriage, on the single line on the down side of Newtownards station, as the down train was to set back on the loop-line to make room for the up train,—was due primarily to the up distant-signal failing to show a red light to the driver of the up train as he approached it.

There is no reason to doubt but that this signal was properly at danger so far as the position of the signal-arm was concerned, but owing, first, to the red glass of the spectacle having been too small as regarded the bull's-eye of the signal-lamp; secondly, to the lamp not having been raised quite as high as it ought to have been; and thirdly, to there having been an unnecessarily large space between the spectacle and face of the bull's-eye, the light showed white to the driver as he approached and came up to it. The trial of this signal by the general manager on the evening following the collision satisfactorily proved the existence of the above defects. They would, no doubt, have been discovered long since, but it so happened that the evening of the collision was the first time for a considerable period during darkness that the signal had had to be kept at danger against an incoming train. The spectacle has now been enlarged, and the lamp chain shortened; and it will also be desirable to decrease the distance between the spectacle and the bull's-eye.

Notwithstanding the defect in the distant-signal, the collision would not have happened had the mixed train been shunted in a proper instead of an improper manner. At the very time the up train was due, it was highly imprudent to have moved this train out on the single line on the down side of the station previously to setting it back into the loop-line; and there was nothing whatever to have prevented it having been backed towards Belfast, and then drawn into the loop by the points at the up end of the station.

The station-master informed me that this latter had been his intention and that he had so instructed the goods guard. This is however denied by the goods guard, and I think it probable that the idea of danger only struck the station-master when he heard the approach of the up train, and tried too late to have the down train stopped. Had he really intended the down train to set back, he should have himself informed the driver what to do.

Again, the collision would have been prevented, had Newtownards been properly arranged as a passing place with a second platform for the down loop-line. This provision is all the more necessary in consequence of the falling gradient towards Belfast; and runaway points should be put in at the Belfast end of the down loop-line to intercept any vehicles that might break away from a train starting from or shunting on this line. I trust that the occurrence of this collision may lead the directors to order, without delay, the construction of this second platform.

I have, &c.,

The Secretary,
(Railway Department,) Board of Trade.

C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on the 21st December.

BELFAST AND NORTHERN COUNTIES RAILWAY.

SIR,

Board of Trade (Railway Department),
13, Downing Street, London, S.W.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the order of the 31st December, the result of my inquiry into the circumstances connected with the accident which occurred on the 23rd December, near Carrickfergus station, on the Belfast and Northern Counties Railway.

In this case a portion (consisting of four passenger carriages, of which the rear vehicle was a third-class break-carriage with a guard in charge of it) of the 7.40 a.m. mixed passenger and goods train from Carrickfergus to Belfast, ran back from Duncrue siding ($1\frac{1}{2}$ miles from Carrickfergus station)—where the engine, tender, a goods break-van, and two waggons had been uncoupled from the rear of the train—and was not stopped until it had run through the station, and for nearly $\frac{3}{4}$ of a mile beyond it.

No personal injuries were sustained, nor was there any damage done to rolling stock.

Description.

The line from Carrickfergus junction to Larne is single, worked with the staff and ticket, and also, from Carrickfergus junction to Carrickfergus, on the block system. Duncrue siding, $1\frac{1}{2}$ miles on the Belfast side of Carrickfergus station, is situated on a gradient of 1 in 87, falling towards Carrickfergus for $84\frac{1}{2}$ chains. This is succeeded by $35\frac{1}{2}$ chains of level through Carrickfergus station, by falling gradients of 1 in 91 and 1 in 151 for 14 and $37\frac{1}{2}$ chains respectively; the gradient then changes to a rising one of 1 in 693, at 7 chains from the commencement of which the carriages were brought to rest. There is a curve near Duncrue, after which the line is nearly straight.

The break-carriage weighed about $10\frac{1}{4}$ tons, there being break blocks on four out of the six wheels. The three other carriages weighed about 24 tons, so that on the runaway vehicles there was available break-power of rather more than $\frac{1}{4}$ th the total weight of the vehicles.

The entrance to the siding at Duncrue is by facing points to trains coming from Belfast. At the time of the accident there was not accommodation to put the whole train into a siding while the waggons in front were being detached. This has since been provided, and no shunting is now permitted until the whole train has been placed in a siding.

The weather was very severe, with frost and snow, at the time of the accident.

Evidence.

1. *George Cameron*, 11 months breaksman.—I was in charge of the 7.40. a.m. mixed train from Carrickfergus to Belfast. The carriages had been standing in Carrickfergus from Saturday night to Monday morning, 23rd. When I joined the train it was made up ready to start, and consisted of goods break, two waggons of brick for Duncrue siding, and four carriages, a break-carriage being at the rear. We started punctually at 7.40. with a ticket. I rode in the rear break compartment, in which there was also a second class season ticket holder, who had come late into the station. My break was off when I joined the train, and I had no occasion to use it before reaching Duncrue. We stopped in the proper place, and I put my break on hard, and having done so I opened the break door to go forward to uncouple, but saw the pointsman going to do so, and therefore did not get out. Directly after this the driver slacked to ease the couplings, which just moved the van, at the same time the pointsman uncoupled. It was not a hard push. The van continued moving backwards, and I continued at the break handle, keeping the breaks hard on. I do not think the wheels skidded, as there must have been frozen snow between the blocks and the wheels. I had noticed something of this before starting, but did not think it of much consequence.

I had no sprags in my break compartment, but there were some in the goods break-van. The speed had increased between Duncrue and the over-bridge south of Carrickfergus to about six miles an hour, and this again decreased at the goods yard facing-points to three or four miles an hour; there was an engine-driver and the pointsman standing near the points. The speed through Carrickfergus station was about three miles an hour, and it afterwards increased to about four miles, and it then gradually decreased till we stopped. I was able to get my break slightly tighter on as we proceeded, but not much. The season ticket holder had jumped out when we stopped at Duncrue, to get into a carriage, but seeing the train move off he did not do so. I think there were nearly 12 inches of snow on the ground. I did not take the time at Duncrue, nor when we stopped after running back. The engine had followed us along, and coupled on as soon as we had stopped. There were no efforts made to stop us at Duncrue. The goods van was usually placed at the front of the carriages, but on this occasion, to save a shunt at Carrickfergus, it had been put next the engine. I should not have had time at Duncrue to leave my van and go to the goods break for sprags and get back.

2. *William Allen*, driver 13 years.—I made up the train before leaving Carrickfergus on the morning of the 23rd December. The carriages had been standing since Saturday in an open siding. I could not say why the goods break had been put next the engine instead of behind the waggons. We started at 7.40, and stopped first at Duncrue. The pointsman there went to uncouple the waggons from the carriages, and called me back to slack the coupling. I reversed and slacked the break, but do not think I put on steam to do so. I then drew up to clear the waggons of the siding points, and was setting back when I observed the carriages moving off. I called to the pointsman to uncouple as soon as possible, as the carriages were running back. He did so, and I at once went out of the siding with the break van and followed the carriages down, keeping about 20 yards from them. There was no attempt made to overtake and couple on to the carriages from the break-van, as I thought it was impracticable. The carriages were 80 or 90 yards off when we began to follow them down. The speed never exceeded six miles an hour.

3. *Thomas Donnelly*, pointsman three years, in charge of the facing-points at the Belfast end of Carrickfergus station.—I was at the points when the carriages ran back on the morning of the 23rd. I thought it was better to let them run along the main line, knowing there was nothing due from Larne for an hour and a half, and seeing by their speed that they would not run far. Their speed at my points

was not more than four miles an hour. I could then have jumped up I think. I did not do anything to stop them. I might have thrown a chain or rope across the rails, but I was afraid of throwing a carriage off. I did not notice that the wheels of the break-carriage were skidding. The guard was looking out of the window. I shouted to him that he was all right, and that they would stop a little below the station. I believe the break was on.

4. *Philip Trainor*, head porter at Carrickfergus station about one year.—I saw the train made up on the morning of the accident. It was not a regular practice to send a goods break-van with the train. The goods van and the waggons had been brought in from Belfast the same morning, and it would have required a shunt to get the break-van to the north end of the waggons. A regular van had run with the train up to the previous Friday. The runaway carriages ran through the station at about four miles an hour. I tried to stop them by putting snow on the rails. One passenger jumped out.

5. *James McFerran*, pointsman 12 years at Duncrue siding.—I remember the 7.40 train arriving on the morning of the accident. I called the engine back to ease the coupling, which was a screw one. It came back quite easy. I followed the waggons up to the siding points. I did not see the carriages run away, and I could not go after them, being otherwise occupied with the waggons.

Conclusion.

This run-back, for nearly two and a quarter miles, of the passenger portion (consisting of four carriages, of which the rear one had a break compartment with a guard riding in it,) of the 7.40 a.m. mixed train from Carrickfergus to Belfast, was no doubt owing to the inability of the break to hold the carriages on the gradient of 1 in 87, when they received a slight push back to enable the waggons to be detached at Duncrue. The break would, under ordinary circumstances, have been quite sufficient to have held the train, but owing to snow having been frozen between the blocks and the wheels while the carriages were standing exposed to the weather on Sunday, the blocks had, till the snow was melted off them, lost their bite, and this, combined with the slippery state of the rails, accounts for the carriages running back in the way they did. The speed of the carriages at the foot of the incline of 1 in 87 must have far exceeded the stated speed, six miles an hour, or they would never have run for nearly half a mile over the horizontal portion on which they then entered.

There was carelessness on the part both of the head porter at Carrickfergus and of the guard in not having seen that the blocks of the break-carriage were in proper working order before starting for Belfast, and there was further negligence on the part of the head porter in not having had the goods break-van placed behind the waggons instead of in front of them.

There appears to have been no great activity displayed by any of the Company's servants in endeavouring to stop the runaway carriages. These men were probably influenced by the knowledge that they would soon stop of themselves, and that there was nothing coming to meet them from the Larne direction.

The arrangements at Duncrue, although no doubt much improved as regards what they must have been when this accident occurred, are not what the Board of Trade would now sanction in the case of sidings on inclines. A loop line should be put in, with runaway points at the Carrickfergus end of the ascending line, above which runaway points all trains should be brought before any shunting is commenced.

I have, &c.,

The Secretary,
(Railway Department,)
Board of Trade.

C. S. HUTCHINSON,
Major-General R.E.

Printed copies of the above report were sent to the Company.

BRECON AND MERTHYR TYDVIL JUNCTION RAILWAY.

SIR,

13, Downing Street, 24th December 1878.

IN compliance with the instructions contained in the Order of the 4th inst., I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the total wrecking of a mixed mineral and goods train, over which the men in charge lost all control, while descending a long incline between Torpantau and Talybont stations, on the Brecon and Merthyr Tydvil Junction Railway, on the 2nd inst.

The train in question belonged to the Brecon and Merthyr Tydvil Junction Railway Company, and consisted of two heavy tank engines in front, 22 waggons loaded with coal, three waggons loaded with goods, 11 empties, a break-van at the rear of the waggons, with the guard and breaksman, and a third tank engine, which was attached to the train behind the break-van. The three tank engines were running with their funnels in front.

The engine-drivers of the two front engines and the firemen of the second and third engines were killed; the fireman of the leading engine was very seriously injured; and the rest of the servants with the train, viz., the engine-driver of the last engine, and the guard and breaksman, who were travelling in the break-van, were cut and bruised.

The Brecon and Merthyr Tydvil Junction Railway between Brecon and Merthyr is a single line. The accident occurred between Torpantau and Talybont stations. Torpantau is about $7\frac{1}{4}$ miles from Talybont. The gradient for the first 300 yards from Torpantau rises 1 in 198 to the south end of a tunnel; it then falls 1 in 68 through the tunnel, which is about 600 yards long; and from the north end of the tunnel it falls on a gradient of about 1 in 39 to within a quarter of a mile of Talybont station, except one short piece about seven chains long, which is about four miles down the incline, where the gradient is only 1 in 60.

Talybont station is at the foot of the incline, and the line from Talybont rises again on a gradient of 1 in 40 towards Brecon.

The permanent way between Torpantau and Talybont is in good order.

The Company's printed rules for mineral trains running between Torpantau and Talybont are, that a train shall consist of 12 loaded or 20 empty waggons to an engine, but there is no rule to prevent several engines and loads being put together in one train.

All goods trains leaving Pant, and going northwards, are ordered to stop at the north end of Torpantau tunnel, to pin down breaks before proceeding down the rest of the incline towards Talybont.

The railway is worked on the block telegraph system; one of the servants in charge of the train being given a written order to start when the signalman has got "line clear."

The evidence is as follows:—

Richard Jones.—I am a waggon inspector at Pontsticill junction. On the 2nd December I examined all the waggons of the train that met with the accident, and ascertained that they were in a good state for running, and had good breaks. I have been waggon inspector for two years and four months. I saw the eight men belonging to the train that met with the accident just before they left, at 8.47 p.m., and believe they were all sober. I did not examine the train as it was formed to go out, but I examined the waggons as they came into Pontsticill at different times.

John Graham.—I am clerk to the traffic manager of the Brecon and Merthyr Railway. The statement which I have compiled is an approximate statement showing the number of waggons in the train in question, and the weight of each waggon. There were 22 waggons laden with coal, three waggons laden with goods, and eleven empty waggons, and a break-van, together with three engines, weighing in the aggregate 397 tons 4 cwt., the waggons laden and empty weighing 278 tons 2 cwt.

Edwin Brain.—I am signalman at Torpantau, and was on duty on the night when the accident occurred. I produce my Line Clear Book. It shows that the

train in question arrived from Pontsticill at 9 p.m. and left at 9.11 p.m. I saw Richard Davies, the breaksman, who came into my box. He said it was good time, 9 o'clock; and asked me if I had a drop of clear water, as he had been eating bread and cheese, and was thirsty. He was quite sober at the time. I also saw Thomas Fury, the fireman of one of the engines. He was on the "Severn" engine, which was the last engine on the train, and I went down to him. He had his overcoat on, and I said it was very cold. He replied that the best place was in the box (meaning the signal-box) such weather as this. On that night the signalman at Talybont did not give me line clear for that train until I had called him for three minutes. The train was later than usual that night. I gave the pass produced to the fireman Fury, which was the authority for the train to proceed. When the fireman said the train was in good time, I understood him to be jesting, as it was very late.

James Cunningham.—I am a traffic inspector in the service of the Brecon and Merthyr Railway Company. On the night of 2nd December I was in my house at Talybont, when my daughter drew my attention to the accident. I immediately went

towards the spot, and when I got to the engines I pulled out my watch, and saw it was 9.35 p.m. That would be about two minutes after my daughter called me. I inquired of some persons that I met whether they had seen any of our men, and was told that one had been taken dead to the White Hart Inn. I found afterwards that three other men had been killed. I at once telegraphed to the traffic manager at Brecon, telling him we had had a fearful accident close to Talybont, and for him to bring down medical assistance with all speed. I again went to the scene of the accident and saw one man taken out of the wreck. It was Joseph Thomas, who was found close by the fire-box of his engine, the "Hercules." I then went to the White Hart, and inquired about the injured men, Thomas Meyrick, guard, Richard Davies, breaksman, Jos. Davies, fireman, and James Bevan, engine-driver. At 11 o'clock a special engine and train bringing Mr. Henshaw, the traffic manager, Mr. Thompson, the secretary, and I believe two medical men and other men, to render assistance. Goods trains are allowed 50 minutes to come down from Torpantau to Talybont, the distance being about six miles. I might have seen two or three trains within a month, which have run past the station at Talybont. I have no recollection of a passenger train running wild in that way. The reason trains run wild is that proper precautions are not taken by the men to pin down their breaks at the proper time, and, secondly, the engine-drivers keeping their steam on till they get to too high a speed. In snowy weather it is very difficult to come down, and great precautions are to be taken; but on the occasion of the accident there was no snow. The instructions provide that every waggon must have a break in good order, and the breaks ought to be put down on all waggons. The maximum load is 12 loaded waggons to each engine, or 20 empty waggons. The rule is to have one break-van to each train. We depend upon the breaks on the waggons principally. I should consider it a waste of power to have more than one break-van. On this occasion there were three engines to the train and one break-van. That is the rule when there are three engines. The maximum speed of goods trains between Torpantau and Talybont is laid down in the rules as 10 miles an hour. It is the speed on all our heavy gradients. The regulation as to putting on the breaks is as follows: Trains coming from Pant must stop at the north end of Torpantau tunnel in order to have the breaks put down. It also provides that a waggon with an imperfect break must be left behind. The process of putting on the breaks would be to put down some of the breaks at the south end of the Torpantau tunnel, and come slowly through the tunnel, stopping at the north end, and pinning all waggon breaks down tightly. Then the guard gives the signal for the train to start, either by hand or verbal, and at night showing a white light with his hand lamp. I have been with those trains hundreds of times, and never had a wild run when those precautions were taken. The guard of the train is the man who is responsible for carrying out the regulations in regard to pinning down the breaks. My experience at this part extends over nearly 15 years. Men have been fined in consequence of those cases of running away, as they were suspected of not having put down their breaks properly. It could not have been ascertained whether the breaks had been properly pinned down on the train in question. Trains are not allowed to leave Torpantau or Tallylyn for Talybont at one and the same time, or not till one train is brought to a stand at Talybont. Some of the men had been on duty for 16 hours. The reason the train was late that night at Torpantau was that a special order came to Cefn station for 500 tons of coal urgently wanted at Birkenhead, and those engines and men had to work the coal from Cyfartha works to Dowlais Top, where we hauled it over to the London and North-western Railway Company. There is a special order that when three engines are used, two are to be front and one behind. My opinion is that

the train in question was not stopped at the north end of the tunnel, and that the breaks were not properly pinned down as prescribed by the regulations. I further think that if portions of the engine (I believe the leading one) had not given way, the train would not have got off the rails. The guards are under my supervision, but, should anything occur that I do not feel myself competent to deal with after investigating it, the whole of the facts are placed before the traffic manager. Frequently I have advised that fines should be inflicted, and in nearly every case they have been carried out. I do not dismiss a man, but I do suspend one if I think proper, until it is settled by the traffic manager. To my knowledge the trains do not now run wild more than usual.

Thomas Meyrick.—I am a goods guard in the service of the Brecon and Merthyr Railway Company. I was on the train that met with the accident. I arrived at Torpantau about nine o'clock that night, and started about 9.10 p.m. After one of the engines had taken water, I believe it was the fireman Joseph Davies said, "Are you right, Tom?" I replied "All right," and we started away. I pinned down as many breaks as possible on my side. When we had entered the tunnel the last engine whistled, and when we got to the north end I told my mate to look after the van break, and I got out and rode on the waggons half-way down the incline to put down the breaks of some of the waggons next to the van. I went back to the van when near the plantation, which is half-way down the bank. The van then began to roll, and the train was gaining speed, I thought. The next thing I recollected is being in bed at the "White Hart." We are supposed, according to the instructions, to stop at the north end of the tunnel, but we did not do so. When we came out of the north end of the tunnel, the breaksman, my mate, showed a red light to stop to the front engines, upon which were Joseph Thomas and Thomas Williams as drivers. But they did not stop. I put some of the breaks down as we were travelling. The speed increased most rapidly after passing the fir plantation. I do not remember speaking to my mate after returning to the van. I am quite sure there was not one man on the train under the influence of drink. It was not a heavy train. The tunnel was full of steam as we went through. If we think we have enough breaks down we do not give the signal to stop, but when we have three engines on we generally do so. We went sharply through the tunnel. Every break ought to be put down, but we do not always do so. I have only once in two years run wild so far as the river bridge at Talybont. I did not hear the front men whistle for the breaks to be put on; but I heard Bevan, the driver of the engine behind the train, whistling for breaks in the tunnel. I was breaksman for 15 or 16 months, but I do not remember running wild during that time. I have been fined for coming on duty late, but for no other cause. I believe the train was going too fast at the north end of the tunnel to enable the drivers to stop. From the tunnel down to the plantation fire and smoke proceeded from the breaks. I came on duty at 4.30 a.m.—(*Recalled.*) I did not give the signal to start to any of the drivers. When I said "All right," I had not pinned down any breaks; I had only dropped them, ready to be pinned down after the train started. I did not speak to my breaksman, who was on the other side of the train, as to whether he was ready before we started. I do not know how many breaks I had pinned down. I pinned down two, but I would not say I pinned down ten. I had my break-stick in my hand. I should have pinned down all the breaks if I possibly could, but the train was going too sharp, and got into the tunnel. I was standing about six waggons from the engine when we started, and the breaks of those six waggons were not taken out of the notches. The drivers were then ready to start, and I gave them "all right," expecting to finish pinning down the breaks at the north end of the tunnel. I carried all my

victuals with me for the day, and I ate none that day except what I carried in my van. I shall have been a guard two years next month. I was 22 years old last June. My pay is 22s. per week, and I work from 5 a.m. to 8 p.m. on one day, and from 4 a.m. to 12.10 p.m. the other. There is one extra man, who acts as relief man to six of us, to equalize the hours. My time-table and time-book were lost in the smash. The driver of the leading engine was with me from middle day, and I am sure he did not go to a tavern. The last place where he could have gone to one was at Cefn, and we left there at 6.30 p.m.

Richard Davies.—I am a breaksman in the service of the Brecon and Merthyr Railway Company. I have been breaksman since January last. I was riding in the same van as the guard Meyrick. I believe all of us on the train were quite sober. I got out of the break-van as soon as the train stopped at Torpantau, and walked along the side of the train, throwing down the breaks ready for pinning when we started. That was opposite the signal-box. I went into the box, and asked the signalman for a drop of water. I did not get any water, and returned to the train walking along to the "Atlas" engine for my break-stick. The "Atlas" was the front engine next the train. Joseph Davies, the fireman of the first engine, then spoke to me about shunting at Tallylyn. I then got off the engine, and Joseph Davies called out to me, "Is the pass right, Richard?" I said I did not know; but, turning round, I saw the signal was off, and said the pass was sure to be right. I heard a voice call out, "Are you right, Tom Meyrick?" I did not hear the reply, for the engine was blowing off. With that they opened the whistles and started, and I began pinning down the breaks, standing on the ground and putting them down as they passed me. Just at the mouth of the tunnel the train was going too sharp, and I missed the last three waggons. I did not tell the guard. Shortly afterwards in the tunnel, I found them going too sharp, and gave the last driver a green light. He was next to our van. I also applied my break in the van. The rear driver opened his whistle in answer to my signal, and kept it open through the remainder of the tunnel. He gave three sharp whistles, which is the usual signal for the breaks. I could see nothing in the tunnel because of the steam from the front engines. I do not recollect speaking to Meyrick. We were going very sharp through the tunnel; I believe it was because the front engines had too much steam on. The rear engine had shut off steam and put on the breaks, and I could feel it holding back. On coming out of the tunnel I gave a red signal. It was not foggy or dark that night. The front engines had shut off steam, but I could not hear any whistles from those engines calling for the breaks. I could see the front engines at that time, but could not see any steam from the whistle. Meyrick then went outside, and told me to look after the van. He returned when we got to the plantation. I do not think we spoke. We were gaining speed rather fast, but I did not feel any danger then. I felt a bit of a jerk about a mile and a half or two miles from Talybont, as though it had passed over something. I then slackened my van-break, and seeing them go on again all right I applied the break again tight. Just above Talybont I felt there was something wrong. There was a lot of dust and smoke about. Sparks were flying from the breaks all the way down. I slackened my break a second time just by Talybont, and caught hold of the door-post and sill of the van near the distant-signal. Just then the van went to pieces over our heads. We were just then past the bridge where the wreck lies. I got a blow on the side of my head. I went down the embankment, and walked away. The guard might have reported that the drivers did not stop at the north end of the tunnel if there had been no accident. I came on duty at 4.30 a.m. and was due home at 5.40 p.m. I believe that if steam had been shut off, and the breaks of the front engines had been put down, we should have stopped at the mouth of the tunnel. I do

not remember a heavy train omitting to stop at that mouth of the tunnel. I only remember one runaway in the twelve months that I have been breaksman. It is our practice to stop at the north end of the tunnel except with light trains.

(*Recalled.*) If possible we put down all the breaks before we get into the tunnel at Torpantau, and at the other end we press them down harder. I was quite ready and waiting for the train to start that night. Joseph Davies, the fireman of the leading engine, asked me if I was right. I have been a breaksman since last January. We always stop at the north end of the tunnel, particularly by night. I never missed stopping there before the night in question. I saw the fireman of the last engine in motion for hooking off, as we were running down the bank, but he did not unhook his engine. I saw him last just before the accident took place. I did not see any steam put on the last engine in order to ease the coupling, nor did I feel any bump from the engine. I felt about two jerks of the van between the plantation and Talybont. I would have put down the three breaks that I left at Torpantau, if I could have done so. I heard the front engine whistle before we left Torpantau, but I cannot say for certain that I heard the last engine whistle, because the front engine was blowing off steam. I do not believe the front engine whistled for us to stop, either in the tunnel or after we came out, but I heard the last engine whistling. The driver of the second engine had been working with me that day. I do not think he had been to a tavern that day. After 1.20 p.m. he had no time to do so. I held the red light to the front engine for half a mile after we came out of the tunnel. I showed it both sides according to the curves. I held out the red light before Meyrick left the van. I never saw drink kept on the engines.

James Bevan.—I am an engine-driver in the service of the Brecon and Merthyr Railway Company. On the 2nd December I reached Torpantau at 9.0 p.m. We stopped there from 10 to 15 minutes, waiting for the front engine to take water. I was driving the "Severn," which was the rear engine. We started on a signal from the two front engines, and I whistled that I was ready. Before I got to the tunnel I found the train was going too fast, and I shut off the steam to allow the guards time to pin the breaks down. On entering the south end of the tunnel I told the fireman to put the break on, as I thought the guards had not got sufficient breaks on. Before I came out of the tunnel I whistled for the van break, and a green light was shown me from the van. I did not know what to make of it. When we got out at the north end of the tunnel I blew the whistle again for the front driver to stop the train. They did not answer in any way, as far as I could tell. We stop at the north end of the tunnel when we get an order from the guard. We generally stop, but it depends upon the kind of train; we stop to have the breaks pinned down. The train was gaining speed all the time. I did not feel any alarm until we reached the Talybont side of the plantation. The train was then going at a great speed. My break was on tight, and I could do no more. I said to the fireman, "Tom, go round and hook us off. We might have a chance of saving ourselves and the guards if anything should happen." That was about two miles from Talybont. The fireman went to try to unhook, but did not do it. I did not see him again. My engine was running quite steadily for the speed. I then lost consciousness until I found myself in the road. I had some cuts on my face, and some bruises on my body and legs. I got up and went on to the bank, and shut the regulator of my engine, as the blow had thrown it open. I knew it was open by the steam coming out of the taps at the front of the engine. I considered the train was running wild after leaving the tunnel. I have been an engine-driver nine years, and have had two wild runs during that time, but none during the last 12 months. My impres-

sion is that the two front drivers gave the engines too much start at Torpantau. I cannot say whether they had their breaks down. I am satisfied that no one on the train was worse for drink. If the leading men had not started so fast, and had put down their breaks, they might have stopped at the north end of the tunnel to pin down the breaks.

(*Recalled.*)—We stop at the north end of the tunnel when we get the red light. If I am on the front engine I look out for a signal from the guard to stop at the north end of the tunnel. The driver would know what breaks there were on the train, and whether it would be necessary to stop at the north end. If I am working a train myself I decide whether we should stop at the north end of the tunnel. We would be 300 yards outside the tunnel before we could see the signal to stop from the guard, and then we should be three or four train lengths before we came to a stand. I know the rule which says that goods trains must stop outside the north end of Torpantau tunnel. It would be impossible to start a train when all the breaks were pinned down. I know the last break should be put down after the train has started. I have been on a wild train about three times in the 15 years I have been in the service of the Company. Those were in snowy weather. I once ran wild with only one engine on, and then we had a train of 22 waggons laden with coal. I do not think a train of 12 loaded waggons would run away with me. I have not reported the occasions when I have run wild.

Morgan Prosser.—I am a ganger on the Brecon and Merthyr Railway, living at Aber. I heard the train coming down when I was in my own house, and told my wife it was a wild run. I expected to see it go through the station, as I have scores of times. Then I heard the crash. I and my men went down to Talybont. We saw pieces of the engines, and left them on the line. I never heard so long a train rush down so quickly. My belief is, that something was dragged into the four-foot between the two bridges. That was the first sign of anything wrong, and it was about 30 yards from the crash. I have been on the line 15 years, and 14 years on this length. I have seen a train go three miles in three minutes on my length. That was some years ago, and in snowy weather. On the Saturday morning previous to the accident a train ran wild to beyond the Llansaintfraed bridge. It was a short train, with one engine and one van, and driven by Joseph Thomas, the same man as drove the front engine in the train that met with the accident. I do not remember when the runaway before that occurred. I have seen a case where a train with two engines has run away. It has been mostly long trains that I have seen run wild.

Thomas O'Keefe.—I am an excise officer at Talybont. When near the bridge where the accident occurred I heard the train approaching at a furious pace. I stood until both engines had passed the bridge. It was about half-past nine o'clock. Before they came to the bridge there were sparks of fire issuing from the engines, and I recommended my companion to run, as I thought the trucks were on fire. He did not run, and was knocked down. I have been here about three months, and during that time I had not noticed a runaway train before.

John Williams.—I am landlord of the "White Hart" Inn. About half-past nine o'clock I heard a fast train coming down, and before I got outside everything was quiet, except the last engine blowing off. I went to the spot. A portion of the van was on fire, and I moved the guard away from it. I have been in Talybont five years. Sometimes, not often, I have heard unusually fast trains. Four years ago I heard a fast train, when there was a heavy fall of snow.

William East.—I am a gardener at Graig-las. I was within 30 yards of the scene of the accident

when it happened. I heard a great noise, but it was quickly over. I saw the bridge in the act of falling. I have lived here three years, and during that time I have repeatedly heard wild trains. I call it a wild train when it does not stop at the station. I have seen them run as far as the Rock Cottage, and that frequently. I never saw a passenger train do so. I have seen trains run wild as far as Llansaintfraed bridge, at least once a month, I am sure. They have sometimes two engines and sometimes three, and I have seen them with only one.

Joseph Davies.—I am a fireman in the service of the Brecon and Merthyr Railway Company. I feel I am able to give evidence. I remember the 2nd December, but I do not remember exactly the time we arrived at Torpantau. We took water for the engines there. The signal was dropped, and I asked Davies (the breaksman) if the pass was all right. "The signal is dropped," he said; "it is sure to be all right." I was on the front engine, the "Hercules." We whistled up to have the signals from the last engine, to ask if they were right. I do not recollect their whistling back. We started then. We were the other side of the tunnel (south side). We came into the tunnel, and kept on steam until half the train was in the tunnel. I remember coming to this (north) side of the tunnel, but did not stop, because we could not. I had my break on tight, but could not stop the train. We opened the whistle for the others to stop, but they did not. Joseph Thomas was my driver. Joseph Thomas said to me, "Joe, do you see anybody your side giving signals?" I said "No." "Well," he said, "there is something not right." We kept on; the train had overpowered us. I never spoke to him or he to me afterwards. I remember going down the bank all the way. I looked back, and saw we were all together. The engine was rolling; we were coming very fast, and the fire was flying out of the chimney. We came near the bridge. I felt a crash, and felt as if the engine jumped up in the air. I found myself on my head, and the scalding water coming over me. I began struggling. I did not know where I was. I struggled and got free. I felt the air reviving me, and I jumped, but did not know where. I got against some railings, and went down on my knees, and thanked God that I was safe. I am sure we could not stop when we got out of the tunnel. My driver tried to stop. I heard no whistling from the other engines. My driver gave two short whistles on coming out of the tunnel as a signal for the drivers behind to stop. I do not recollect that my driver reversed his engine. I do not recollect that there was any snow or frost upon the rails. I think both of the engines were on the rails till we got over or on the bridge at Talybont. I do not know that any waggons were off the rails before the crash. My driver must have had the signal from the last engine before he started from Torpantau, but I did not hear it; the signal is a crow given by the whistle. I had been firing for Joseph Thomas 18 or 19 months. We have come from Torpantau without stopping at the north end of the tunnel. We ran past the Talybont station as far as the Rock Cottage the week before the accident, and that was with one engine on. I had to hold fast to the engine in coming down the bank that night. I think we had our supper on the engine at Cefn. We began work at 3 o'clock in the morning, and we ought to have finished at 5 o'clock that night, but we had extra work to do, because of some coals being wanted immediately at Birkenhead. I believe the breaks were down on the trucks when we left Torpantau. Our steam was shut off when half the train had got into the tunnel, but the engine behind us kept on steam a little longer. All the breaks are supposed to be put down before we start from Torpantau. I have only had one wild run during the five years I have been in the service. We have run as far as the Usk bridge many times. We stop at the north end of the tunnel to pin down the breaks tighter.

Mr. C. H. Thomas.—I am resident engineer on the Brecon and Merthyr Railway. The line from Torpantau signal-box is on a rising gradient of 1 in 198 to the mouth of the tunnel (south end), 1 in 68 falling through the tunnel, then a gradient of 1 in 39 falling for about $6\frac{1}{2}$ miles to Talybont station, with the exception of a small distance of seven chains midway where the gradient is 1 in 60. On examining the line after the accident I found nothing wrong except close to the bridge where the accident happened. At a point 1,708 yards on the Torpantau side of the scene of the accident, south of the canal bridge, I found the connecting rod of the second engine, "Atlas," lying between the rails. At a short distance in the direction of Talybont I found some brasses in the four-foot, being parts of one of the engines. I did not then find anything further until I came to a point 637 yards south of the canal bridge, where I found a portion of a connecting strap, a broken tap, the connecting rod of the front engine "Hercules," and within a distance of about 200 yards further I found about a dozen pieces of the working gear of the engines. Then at a point about 20 yards south of the canal bridge I found a rail had been broken in two places, and also on the canal bridge found another rail broken. The breaks are quite fresh, and I have no doubt the rails were broken by the shock of the accident. They were both iron rails, rolled in 1871. At a point a few yards north of the first broken rail I found traces of a truck having left the rails. North of the canal bridge the permanent-way was completely broken up, and the east girder of the bridge over the road was knocked out of position, and a considerable portion of the north abutment and wing of the bridge destroyed. Immediately on the other side of the bridge the whole train was a complete wreck. The curve at the place where the accident occurred has a radius of 22 chains, and the superelevation is $4\frac{1}{2}$ inches. The superelevation would be regulated for a speed of about 40 miles an hour. I examined the railway the morning after the accident, and found it true to gauge, but in about two places knocked slightly out of line, caused by the oscillation of the runaway train. I have never heard any complaints of the rails in the tunnel being particularly slippery in certain weather, so as to render trains unmanageable. I believe the rail was broken by the shock caused by the front part of the train being suddenly brought to a stand. This rail, though broken, did not leave its position. I should think the speed of the runaway train was over 60 miles an hour. I should think the impetus of the train carried it off the curve. From the place where the train started, at the south end of the tunnel, to the spot where it ran off the rails, is $6\frac{3}{4}$ miles. The embankment down which the train fell is about 16 feet high at that place.

Mr. Charles Long.—I am the locomotive superintendent of the Brecon and Merthyr Railway Company. The "Hercules," the leading engine of the train, was a six-wheel coupled-saddle tank engine, with break-blocks on all wheels; and she weighed, with full tank, 37 tons. It was in good order, and only turned out of the shops in December. The break-blocks and the whole of the break-gear were in good order. The "Atlas" was turned out of the shops in October last, having undergone thorough repair, including a new set of steel tyres. The weight was 36 tons 2 cwt. There were breaks in good order on all the wheels. The "Severn," the rear engine, was turned out of the shops in September 1876. The weight was 35 tons 13 cwt. The break-blocks were all equally good. We are very particular in regard to the state of the break-blocks. From the evidence I have heard, and the examination I have made of the engines since the accident occurred, I think that the men discovered on this (Talybont) side of the plantation that they had utterly lost all control of the train, and that they felt something was going to happen; and I imagine that they had all done what they could with their breaks, and, as an extra precaution, these men had reversed their engines. At

the speed they are said to have been travelling (over 60 miles an hour), the machinery must have been moving at 500 revolutions a minute; and reversing at such velocity, something was almost certain to give way. The machinery would be apt to give way at 300 revolutions. In our practical experience of all railways, it is very common occurrence for the very details to give way which gave way in this case, even without a wild run or without reversing; and those parts are examined closely once a week, in addition to the driver's examination every morning. The details referred to are the connecting-rod straps and keys. The giving way of those details would have no tendency to throw the engine off the road, unless they interfered with the wheels, which does not appear to have happened. My opinion is that the train left the rails owing to the high velocity at which it approached the curve at the place where the accident occurred. There is a mark of a truck wheel on the permanent way. It must have been a light wheel, from the mark on the sleeper. Had it not been for the curve, the train would have continued its way in safety. It was the left-hand connecting-rod strap that gave way, and the front cylinder cover in each case was broken. The drivers are allowed half an hour every morning for examining their engines, and the engines are examined at night by a competent foreman. We have a day-book for entering reports respecting the engines. There is a separate book for each engine. The giving way of the parts of the engine referred to had nothing to do with the accident.

Francis Taylor.—I am locomotive foreman of the Brecon section, to which the engines concerned in the accident belonged. The engines came into the shed on Saturday night previous to the accident. Nothing was reported by the drivers as wanting to be done to the engines. I saw the engines at work on Saturday, and they were then in thorough working order.

Mr. Alfred Henshaw.—I am traffic manager of the Brecon and Merthyr Railway. We have taken precautions against two trains fouling one another at Talybont, by providing in our regulations that no train shall leave Torpantau for Talybont when a train is on the road from Tallylyn to Talybont, and the reverse way the same. In regard to the examination of waggons, we have six men stationed at different points on the line for that purpose, two being at Pontsticill junction. The positive instructions are that all waggons that are found defective are to be shunted off, and the numbers reported. In regard to trains running wild, the instructions to the men at Talybont are that if a train runs over the Usk bridge, the circumstance is to be reported to me. But if it stops short of that point, I do not think it sufficiently serious to be reported to me. I have had two cases reported in two years, and they were thoroughly investigated. The train which ran wild on the Saturday previous to the accident had 12 loaded waggons, and left Torpantau at 7.5 a.m., and reached Talybont at 7.54 a.m.; so it was 49 minutes working down to Talybont. I took the times from the block books. The train that met with the accident covered the distance, as far as we can ascertain, in 22 minutes. It was not reported to me that a train ran wild through Talybont station on the day of the accident. One wild run occurred in September, and I took it up strongly. The men took the trucks away with bad breaks, and I strongly censured them. A gentleman of this neighbourhood told me that the trains ran very sharp, and I cautioned the men. It is the duty of the stationmaster and others in charge of Talybont station to report cases of wild runs. The Usk bridge is about 400 yards from the Talybont station, and Rock Cottage about half a mile.

Mr. Alfred Crawshaw.—I have lived in this neighbourhood about five years. I have seen trains run wild, I should think, about 20 or 30 times in 12 months. I have seen them pretty often run as far as Rock Cottage.

The train in question arrived at Torpantau from Pontsticill at 9 p.m. on the night of the accident. The engine-drivers took water; the guard and breaksman were engaged on each side of the train in putting down breaks; and the signalman stationed at Torpantau, having got "line clear" from Talybont, gave the ticket authorising the train to start, to the fireman of the last engine; and the train left Torpantau at 9.11 p.m.

From the evidence it appears that the breaksman put down and pinned all except three waggon breaks on his side of the train; that the guard let down all the breaks on his side except the six next to the engine, but he stated that he could only pin down a few in consequence of the train starting away into the tunnel at too great speed. He had given the men on the leading engine the signal to start. He expected that the train would stop at the north end of the tunnel, in accordance with the printed instructions, and he intended then to put down more breaks; but the train did not stop at the north end of the tunnel; and as the guard thought that it was going too fast, and that the drivers could not stop, he left his van, and went out on the waggons nearest to his van to try and pin down some more breaks; but the train was gaining speed rapidly, and he returned to his van. The breaksman had not pinned the breaks down tightly at his side, as he intended to do so when the train stopped at the north end of the tunnel.

About five miles down the incline, two connecting-rods and other parts of the working gear of the engines were found strewn on and about the line for a distance of about 15 chains. The breakage of the working gear appears to have been caused by the engine-drivers of the leading engines reversing their engines while travelling at very high speed. The working gear connected with the left-hand cylinders of the two leading engines gave way, and the cylinder covers were broken.

The train pursued its headlong course, at a speed estimated as being 60 miles an hour, towards Talybont; and after the leading engines passed over a canal and a road bridge, which are about 20 yards apart, and about a quarter of a mile south of Talybont station, they left the rails and fell over the bank, dragging the whole of the train after them. The bank at this spot is about 16 feet high, and the curve of the railway, which is the sharpest curve on the incline, has a radius of 22 chains. The train went off the rails on the outside of the curve. The engine at the tail of the train just cleared the second bridge, which was the one over the road, and came to a stand on the north abutment wall, of which it knocked down about six feet. The wooden platform of this bridge was destroyed, and the girder at the east side was considerably damaged, and fell over into the road below. The girder of the canal bridge at the same side of the line was also slightly damaged, and two rails at the west side of the line were broken. One of these rails was about 20 yards south of the canal bridge. It was broken into three pieces, but remained in its place in the chairs, and the second rail was on the bridge. The permanent way over both bridges, and for about 50 yards north of them, was completely broken up. There was a light mark of the flange of a wheel on a few of the sleepers at the south side of the canal bridge, which was, no doubt, caused by one of the waggons being jerked off the rails when the two leading engines fell over the bank. The marked sleepers were between the first broken rail and the canal bridge. The rail was probably broken from the same cause.

The two leading engines buried themselves in the clay at the foot of the bank about 50 yards north of the road bridge. The waggons were broken to pieces, and formed one confused mass between the engines and the road bridge.

The van in which the guard and breaksmen were riding, and the engine at the tail of the train, were also considerably damaged. The fireman of this engine, who was killed, had gone on to the front footplate to try and uncouple the engine from the break-van, when his engine-driver found that he had no power of checking the speed of the train.

The Brecon and Merthyr Tydvil Junction Railway is a line of heavy gradients, and the incline on which the accident happened is one of the severest in the kingdom, and requires the most careful attention in working.

The rule as regards the size of the trains, and their stopping at the north end of the tunnel to pin down breaks, is good, as far as it goes; but I consider that it would be better, if a train was limited to 10 loaded waggons, and the loads of two or three engines should not be put together in one train, as the men in charge cannot be certain of working in unison, and the several parts of the material of the train become dangerously strained.

The servants of the Company appear to have been in the habit of not paying much attention to the rule desiring them to stop at the north end of the tunnel. They

sometimes have done so, and at other times not. Those travelling in the rear part of the train do not even appear to have known when the engine-drivers in front of the train intended to stop or not.

The method of working this part of the Brecon and Merthyr Tydvil Railway by means of the block telegraph alone is not safe, and it should be supplemented by the train staff and ticket system.

There is a good deal of discrepancy in the evidence as to the number of runaway trains, commonly called "wild runs," which have taken place on this section of the railway; and I am inclined to believe that a good many have taken place from time to time, though fortunately unattended with injury to the servants in charge of the trains, and consequently they have been kept from the knowledge of the manager of the railway.

The runaway or "wild run" above reported on appears to have been caused by the engine-drivers of the two leading engines of the train having started from Torpantau at such speed that they could not control their train. The speed at which they started their engines prevented the guard from pinning down as many waggon breaks as he intended, and the drivers themselves appear to have been unable to stop the train at the north end of the tunnel, which was less than half a mile from where they started.

The train was about 22 minutes in travelling the seven miles from Torpantau to the spot where it was wrecked. The great strain on the permanent way, caused by the heavy tank engines running at great speed round the 22-chain curve, either burst the rails, or caused the engines to mount the outer rail of the curve, and then to run down the embankment, and drag the whole train after them.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
F. H. RICH,
Colonel, R.E.

Printed copies of the above report were sent to the Company on the 9th January.

CALEDONIAN RAILWAY.

IR,

Aberdeen, 1st November 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in your Minute of the 8th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 5th ultimo, at Ferryhill junction, near Aberdeen, on the Caledonian Railway.

In this case, as the 8.40 a.m. down passenger train from Stonehaven to Aberdeen was passing over the crossing of an engine shed siding with the main down line at Ferryhill junction, the proper off leading wheels of the tender, and the proper off driving and leading wheels of the engine (which was running tender first), dropped off the left rail, followed by the left wheels of the whole of the 12 vehicles composing the train. The tender and engine wheels remounted the rail, and were stopped in about 120 yards from the crossing point, the whole of the train remaining coupled together.

No passengers or servants of the Company were injured.

The damage to rolling stock was very slight, the cost of repairs amounting only to 3*l*.

In the permanent way 64 chairs were broken, one rail was bent, and 11 sleepers had to be renewed.

Description.

At Ferryhill junction, about three quarters of a mile from Aberdeen, the Deeside Railway joins the Scottish North-Eastern Railway. The signal-cabin is about 150 yards south of the junction points, and 40 yards south of the signal cabin; an engine shed siding joins the main down line with trailing points. The right rail of this siding crosses the left rail of the main down line 29 yards south of these points, and it was at this crossing that any wheels first left the rails. The crossing is of the usual description, with a chair under the crossing point; the guard rail opposite the crossing is 15 feet long, extending seven feet to the north of the crossing point, and eight feet to the south of it. The main line curves to the east with a radius of 20 chains, and

the super elevation of the outer or west rail is about four inches. The line falls northwards on a gradient of 1 in 270. The gauge is correct, and is stated to have been so when the accident occurred. There is nothing specially calling for remark in the nature of the permanent way, except that the chairs at the crossing are rather narrow in their seat, being only four inches wide.

Evidence.

1. *William Thomson*, signalman three years.—I came on duty at Ferryhill junction at 6 a.m. on the 5th October. The 8.40 a.m. train was signalled to me from Cove, 8 minutes late. I was able to give it a clear road, and it approached my cabin with the signals off for it. I was looking at it as it approached the cabin, and the first thing I noticed was a carriage truck off the rails, next but one to the engine, which was at this time about 20 yards from the cabin. I held up my hand to the driver, and I think we both noticed what had happened at about the same time. His steam was off, and he had his break put on at once. The speed was about 6 to 8 miles an hour. He had to stop at the ticket platform about $\frac{1}{4}$ of a mile further on. All the vehicles behind the carriage truck then left the rails. When the train stopped, the centre of it was about opposite the cabin. I saw no wheels over the left rail. The accident occurred at 9.28. The crossing had been last passed over by an engine going from the sheds to Aberdeen, about 10 minutes before the train. Nothing had been off the rails at this crossing since I have known the place.

2. *Alexander Moir*, driver six years.—I left Stonehaven punctually at 8.40 a.m. with a train (from Cove) consisting of nine carriages, two fish trucks, and a break-van. My engine was a 4-coupled one, with the driving and trailing wheels coupled, and a 4-wheeled tender. I was running tender first, because there is no engine turntable at Stonehaven. I had last stopped at Cove, and had next to stop at the ticket platform. I had been slackened by signal, but not stopped, at Craiginchies, about $\frac{1}{2}$ mile from the junction. The signals were off for me at the junction, and I was running past it at about 10 miles an hour, when I felt the engine give a heave on the left side, as it passed the crossing of the engine-shed siding. My steam was shut off at the time. I put my reversing lever from backward to forward gear, and then at once back again, my object being not to stop too suddenly. I did not put steam on. I had my tender break put on when I first felt the jerk. The engine, I think, got on the rails again after one revolution of the wheels, and remained on them, as well as the tender wheels, till we stopped. The trailing wheels of the tender never left the rails, and I do not think the trailing wheels of the engine did either, there being no marks on them; but there were marks on the leading and driving proper right wheels. All the other vehicles left the rails. The third vehicle from the engine had its left wheel about 18 inches from the left rail, which was bent outwards, and the other vehicles were in a somewhat similar position. On going back, I found the left crossing chair at the point broken, and two others north of it also broken. I did not observe the opposite check rail. The left check rail was pushed outwards, the chairs being broken. Fireman William Grassie was alone with me on the engine. I have sometimes felt slight jolting in passing the spot, but nothing to call for special remark.

3. *William Grassie*, fireman 18 months.—My break was slightly on when I felt the engine drop, and I did not apply it at all hard till we stopped. I did not

see the driver alter the reversing lever. Otherwise I agree with his evidence.

4. *James Shepherd*, guard three years.—I left Stonehaven punctually at 8.40 a.m., and from Cove the train consisted of a carriage truck, fish van, four third-class carriages, a break carriage, one first-class, one third-class, one composite, one third-class, and a break-van, 12 vehicles in all. I was the only guard with the train, riding in the rear van. Our speed on approaching Ferryhill junction was about six miles an hour. I was looking forwards for signals, and observed the fish van begin to oscillate, followed by the rest of the carriages. This was between the points and the cabin. I applied my break, and the train came to a stand with my van near about the crossing. The right front wheel of the van was across the right rails, and the right rear wheel on the right rails. The front wheels of my van were further from the rails than those of any other vehicle. No passengers complained to me of being hurt. I was not thrown down. The accident occurred at 9.27, about seven minutes late; we had lost time principally in running, owing to slippery rails.

5. *John Duthie*, foreman platelayer eight years, from Ferryhill up distant-signal for two miles southward.—I had last worked at the crossing a few weeks before the accident. The work consisted in packing up the sleepers which had been renewed about 12 months since. I got to the crossing about 20 minutes after the accident. The point-chair was the first one broken, and then the next chair north. The breaks looked fresh. There was very little the matter with the right rail, but the left rail from the crossing northward was pushed outwards; the greatest spreading of the gauge being about a foot. There is about four inches cant to this curve. I could not tell how the accident had happened. None of these crossing chairs had been broken before to my recollection. There was no disturbance at all to the check rail opposite the crossing. The keys were all good.

6. *Thomas Milne*, locomotive foreman at Aberdeen.—I reached the spot about three minutes after the accident. The right wheels were all on the right rail, except the right leading wheel of the van, which had crossed the right rail, and the right leading wheel of the fourth vehicle, which was also over the right rail; the rear right wheel was on the rail. All the couplings had held good. The rear van was not more than three yards north of the crossing. All the wheels of the engine and tender were on the rails. The proper right leading wheel of the tender, and the proper driving and leading wheels of the engine, had marks on the face of the tyres, leading me to believe that they had been down inside the left rail, but not on the ballast. The first broken chair was under the crossing-point, and the next one north of that was also broken, and the wing rail turned over. The left rail was standing upright, but pushed outwards, the chairs being, some broken, and in others the spikes drawn. The check rail opposite the crossing was not disturbed. I did not notice any keys loose or deficient. The engine referred to by the signalman was only recently out of the shop.

Conclusion.

" The cause of this accident is somewhat obscure, but was most likely due to the sole of the chair under the point of the crossing of the east rail of the engine shed siding and the west rail of the main down line, having been broken by the passage

of some previous engine from the shed, without the fracture having been observed. The fracture of this chair allowed an undue pressure to be brought upon the next chair north, which then probably broke in the sole; this allowed some of the left wheels of the tender and engine to force the rail outwards, and drop inside it for a short distance, after which they appear to have again got on the left rail. The west rail at the crossing having been thus disturbed, the left wheels of the vehicle next the tender dropped inside it, and, not being able to regain it, must have burst the rails all along, in some cases breaking the chairs, and in others drawing the spikes. The curious points are that the right wheels should have, in almost all the vehicles, remained on the east rail, which was the inner rail of the curve; that the west rail should have been displaced to the extent of a foot (as it is stated to have been); and that the check rail should not have been disturbed.

The engine had been last repaired in March last, when all its tyres had been turned up. The tender tyres are, however, a good deal worn, and want again turning up.

I have, &c.,

The Secretary,
Railway Department, Board of Trade.

C. S. HUTCHINSON,
Major-General R.E.

Printed copies of the above report were sent to the Company on the 21st December 1878.

CALEDONIAN RAILWAY.

Board of Trade, (Railway Department),
13, Downing Street, London, S.W.,

25th January 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 16th ultimo, the result of my inquiry into the causes of a collision which occurred on the 14th ultimo, near Wemyss Bay junction, on the Caledonian Railway.

In this case, the 7.45 a.m. down passenger train from Glasgow to Greenock, consisting of engine and tender, break-van, one second-class, two first-class, and four third-class carriages, and a third-class carriage with break-compartment in rear, was brought to a stand with the tail of the train about 270 yards outside the down home-signal at Wemyss Bay junction, and while so standing in a dense fog, was run into from behind by the Greenock portion of the down limited mail, 6.40 a.m. from Coatbridge, consisting of engine and tender, one carriage, and one break-van.

Thirteen passengers and one servant of the Company are stated to have complained of being injured.

No damage was done to the permanent way, but the rear carriage of the 7.45 a.m. train was broken up, and some buffer castings damaged throughout this train.

The funnel of the engine of the mail train was knocked off, and the buffer-beam broken.

Nothing left the rails except the trailing wheels of the rear vehicle in the 7.45 a.m. train.

Description.

Wemyss Bay junction is about 36 chains west of Port Glasgow station, on the Glasgow and Greenock section of the Caledonian Railway. It is protected by the usual signals, the down distant being 640 yards, and the down home-signal 96 yards, on the Port Glasgow side of the junction.

The line is straight for nearly the whole distance from the distant-signal to the junction, and is level.

The point of collision was on the down line, about half-way between the two signals, and about 420 yards west of Port Glasgow.

The line is worked on the block system, with semaphore block telegraph instruments, and a code of rules and signals, of which the following apply to this case:—

RULES FOR WORKING THE BLOCK TELEGRAPH.

1. The semaphore arm on the block telegraph instrument is to stand at "danger," and is to be lowered only by the signalman in the box in *advance*, in acknowledgment of the advice of the "preparatory signal" of an approaching train.

2. No signal is to be considered complete until the proper acknowledgment of it has been received. Should the signalman in the box to which the signal has been sent not reply, the signal is to be repeated at short intervals until the acknowledgment is obtained.

3. No signal is to be cancelled until after it has been acknowledged.

4. All signals are to be given *slowly* and *distinctly*, the plungers being pressed well home. Should an indistinct signal be received, the "repeat" signal is to be given, when the sending signalman will repeat the last signal given by him.

Code of Signalling.

<i>Preparatory Signal.</i> —To be sent to the box in <i>advance</i> when a train is ready to commence its journey; also to be sent to the box in <i>advance</i> when the signalman in the <i>rear</i> has signalled a train or empty engine as having passed his box.		Advice.	Acknowledgment.
} Passenger train,	3 beats on bell or gong.		If the line is clear, lower the arm.
<i>Block Signal.</i> —To be sent to the box in <i>advance</i> when the train or empty engine has passed the signal box.	2	do. do.	Raise the arm to "danger."
<i>Repeat Signal.</i> —To be sent when an indistinct signal has been received.	8	do. do.	Repeat the last signal sent.

The 7.45 a.m. train was fitted throughout with Westinghouse break.

Evidence.

John Lyme, driver 12 years, states: On the 14th December I was driver of the 7.45 a.m. down passenger train from Bridge Street, Glasgow, to Greenock, consisting of engine and tender, and nine vehicles, all fitted with Westinghouse break. We left Port Glasgow at 8.37 a.m., six minutes late, and found the distant-signal from Wemyss Bay junction at "danger." It was a very thick morning, and I did not see it till close on it. I sounded my whistle at once. I was running about eight miles an hour at the time. I passed the distant-signal at "danger," and never saw it dropped. I could not see the home-signal. When about half-way between the distant and home signal I applied the break. I put it on slightly, so as to check speed in case I found the home-signal at "danger." There was about 40 lbs. pressure. The break went on and pulled up the train. I sent my mate back to tell the guard, because I could not get the break to come off. About two minutes after this the collision took place. I was leaning over the side of the engine, and I was knocked off, but not hurt. The train was driven ahead about an engine's length. My engine is a four-wheel coupled engine, with driving and trailing wheels coupled. There are break-blocks on the driving-wheels worked separately from the train break. There is one block to each of the four tender wheels worked with the train break. My engine break was not on. My break had been working all right from Glasgow to Houston. We then found that it was impossible to keep up the pressure, which had been up to 100 lbs. on leaving Glasgow, and on reaching Port Glasgow my mate screwed up the nut on the pipe leading from the pump to the main reservoir. After the accident this nut was found to be cracked, and therefore the pump could not bring off the break. I did not run over any fog signals.

George Walker, fireman six years, states: The driver's evidence is correct. I went back when we were stopped, and told the guard that the breaks were on, and would not come off, and I then went under the carriages to turn the cocks and release the breaks.

I had turned one off, and had come out from under the carriage, when the collision occurred.

Christopher Downie, passenger guard four years, states: On the 14th December I was guard of the 7.45 a.m. down passenger train from Glasgow to Greenock. The train was made up as follows:—Engine and tender, break-van, one second-class, two first-class, four third-class carriages, and third-class carriage with break-compartment in rear. I was riding in the rear break-compartment. We left Port Glasgow at 8.37 a.m., six minutes late. I saw the Wemyss Bay junction down distant-signal at "danger" as we passed it, and heard the driver whistling. At about 200 or 300 yards past the signal we stopped. I felt the driver try to start the train two or three times, but he couldn't succeed. I couldn't hear whether his pump was going. I could see by the gauge in my van that the break was on. I got out and went forward to see what was wrong. I met the fireman coming back, and he told me that the break wouldn't come off. He was then getting under the train to disconnect the breaks. I was on my way back to the van, to make preparations for going back to protect the train, when the collision occurred. The train which ran into us must have been running nearly 15 miles an hour. It smashed the rear vehicle, and damaged some of the buffer castings throughout the train. No vehicle was thrown off the rails, except one trailing wheel of the rear vehicle, which was off. The only person in this carriage was a servant of the Company. He was slightly hurt. No passengers complained of being hurt at the time. There was so much fog that the train which ran into us was not visible for over a carriage length. My tail and side lamps were lighted. I didn't see any fogmen.

George Callan, driver 17 years, states: On the 14th December I was driving the Greenock portion of the down limited mail from Coatbridge, consisting of engine and tender, one carriage, and one break-van. We left Coatbridge at 7.27 a.m., 47 minutes late, and Port Glasgow at 7.42 a.m., 61 minutes late. The morning was very foggy, and I was running cautiously.

The down starting-signal at Port Glasgow, and the down distant-signal from Wemyss Bay junction were both off for me. I ran past the latter signal at about six miles an hour, and had increased speed to perhaps 12 miles an hour, when I saw the top of a carriage on the line in front of me. I turned off steam and reversed my engine, and called to my mate to put on the break. There was no time to get the break on, but I had just got back steam when we ran into the train ahead of us. I don't think I saw it above six or eight yards. Both I and my mate stuck to the engine, and were not knocked down. We ran through the rear carriage of the train, and the funnel of my engine was knocked off, and the buffer beam broken. There were only three or four passengers in my train, and I don't think any were hurt. The only breaks in my train were hand-breaks on tender and break-van.

David Wilson, passenger guard eight years, states : I was guard to the Greenock portion of the limited mail on the 14th December. I did not know of anything being wrong till the collision occurred. I at once went back to protect the train. No passengers in my train complained of being hurt.

John Waters, signalman three weeks, and three months under previous training, states : I have been all my life employed on railways, until I met with an accident when goods guard. On the 14th December 1878 I came on duty at Port Glasgow station signal-box at 7.50 a.m., for a 12 hours shift. I gave the "preparatory" signal to Wemyss Bay junction for the 7.45 a.m. down passenger-train at 8.32 a.m. The signalman at Wemyss Bay junction immediately answered by lowering the semaphore signal in my box, which rings one beat on the bell. I gave the second "preparatory" for it when I had got the block signal for it from Port Glasgow goods cabin. This train arrived at 8.36 a.m. and left at 8.37 a.m. As soon as it had left I gave the block-signal, two beats on the gong. The reply to this should have been the raising of the semaphore-arm to "danger" with one ring. I had turned to my desk to book the train, and cannot say that I heard any ring, nor did I see the semaphore

arm raised to "danger." I had received warning of the mail at 8.36 a.m., and as soon as I had booked the 7.45 a.m. down train I booked the "preparatory" for the mail, to save time. This train arrived at 8.40. I sent on the "preparatory" signal for it as soon as I had booked it at 8.37. In reply I got eight beats on the bell for "repeat last signal." By that time I had got the block-signal for the mail from Port Glasgow goods, showing it had left. I gave three beats on to Wemyss Bay junction, the second "preparatory" for the mail, in answer to the eight beats. I got no reply to that, but on looking at the dial I saw the semaphore-arm was lowered. I did not hear the bell, but I took that as showing that the line was clear. The mail arrived at 8.40 a.m. I let it go on at 8.41, and sent on the block-signal at 8.41. This signal was properly acknowledged. The reason I thought the line was clear, on seeing the semaphore-arm down, although I heard no bell, was that I had that morning seen the arm of the semaphore worked from Port Glasgow goods rising and falling without ringing the bell, and I thought it was affected by the frost. I know that I ought to have repeated the block-signal for the 7.45 a.m., as it was not properly acknowledged.

John Dunlop, signalman nine years, states : On the 14th December I came on duty at Wemyss Bay junction at 7.30 a.m. for twelve hours. I got the preparatory-signal, three beats, for the 7.45 a.m. down train at 8.30 a.m., and answered it at once. I received no other signal till I received three beats again at about 8.34 a.m. I took no notice of this, but passed it on. The next signal I got was another preparatory, three beats, at about 8.38 a.m. I did not book either of these signals, and, as I could not understand getting three preparatories running, I gave the repeat signal, and I got the preparatory again. I am quite certain that the third signal I got as above was the preparatory, three beats, and not the block, two beats. I am certain I did not get the block-signal for the 7.45 a.m. train. I was not out of my cabin, and the instruments were all working well. There was no one in my box.

Conclusion.

From the foregoing evidence it appears that the breaks of the 7.45 a.m. down passenger train from Glasgow to Greenock, having been applied slightly by the driver of the train on approaching Wemyss Bay junction, went full on, and brought the train to a stand about half-way between the down distant and down home signals. It seems that the driver in tightening up a nut on the pipe leading from the air-pump on his engine to the main reservoir, had cracked it, causing a leak in the pipe, and consequently he was unable to get up sufficient pressure to release the breaks when once applied. He was thus unable to start his train, because a part of the automatic break was not in proper working order.

While the train was so standing, during a fog so thick that the tail-lamp was not visible from an approaching train for more than a few yards, it was run into at a speed of about 12 miles an hour by the Greenock portion of the down limited mail, which train had been improperly allowed to start from Port Glasgow station.

The correct signal was given on the block telegraph instrument from Wemyss Bay junction for the 7.45 a.m. train to approach, and the signalman at Port Glasgow cabin avers that after it passed he gave the "block signal" for it to Wemyss Bay junction cabin. This the signalman in the latter cabin denies, and, as the Port Glasgow signalman admits that he did not see the proper acknowledgment of his "block signal" given by the raising of the semaphore-arm on the instrument to "danger," and yet that he did not repeat the "block signal" according to rule, I have no doubt whatever that he, the Port Glasgow signalman, is mistaken, and that the block-signal was never given. The semaphore in Port Glasgow cabin therefore quite properly remained off, and being seen in this position, it was taken by the signalman in this cabin as an answer to his "preparatory signal" for the mail, which he accordingly allowed to start.

The accident was therefore clearly due to carelessness on the part of the signalman

in Port Glasgow cabin, who disregarded the rules for the working of the block telegraph instruments, and also a rule specially issued, to the effect that signalmen are to look carefully at the raising or lowering of the semaphore-arm on their instruments, apart altogether from the ringing of the bell or gong.

The driver of the 7.45 a.m. train is also to blame in having disobeyed Rule 47 in the Company's book, under the terms of which he should, on finding the distant-signal at "danger," have brought his train at once to a stand, or nearly so, for, owing to the fog, he could not possibly see whether the way was clear for him or not. Had he done so the train would have been stopped somewhat sooner than it was, and at a point some 200 or 300 yards nearer to Port Glasgow station, and it is quite possible that under these circumstances there might have been time for the guard to get back to protect his train.

It should also be remarked that, in spite of the dense fog which prevailed, there were no fog-signalmen at this part of the line.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company.

CORK AND MACROOM DIRECT RAILWAY.

SIR,

Cork, 4th October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 9th ultimo, the result of my inquiry into the very serious accident which occurred on the 8th ultimo, near Ballincollig station, on the Cork and Macroom Direct Railway.

In this case, as the 7.15 p.m. (Sunday) passenger train from Macroom to Cork, consisting of a tank engine (running chimney first), two third-class carriages, one first-class carriage, one second-class carriage, and a break-van, five vehicles in all, was running round a slight curve about $1\frac{1}{4}$ miles east of Ballincollig station (where the train had last stopped), the engine and nearly all the vehicles left the rails. The engine ran off to the right or outside of the curve and turned over on its right side on the slope of a slight embankment, about 70 yards from where it had first left the rails. The front frame and part of the side frame of the third-class carriage next the engine were torn away by the engine as the latter was turning over, and this carriage ran for about 20 yards beyond the engine and then turned over on its left side, followed by the third-class carriage next it. The two front wheels of the first-class carriage were pulled across to the left, and its rear wheels were off the rails and inside them. All the wheels of the second-class carriage were off the rails and inside them; all the wheels of the van being in a similar position to those of the second-class carriage.

Two passengers were killed on the spot, and a third died on the 18th from the effects of injuries received. Fifty passengers were injured; in 16 of the cases limbs having been fractured.

The driver was killed on the spot, and the fireman, who was severely injured, died on the following day.

The damage to rolling stock was as follows :—

Tank engine.—Life guard broken; left leading axle-box cracked; top leaf of right spring of driving wheel cracked; right corner of buffer beam broken; coal hunker destroyed.

Third-class carriage next engine.—Front frame and part of right side frame torn out; one of the cross-stays broken; leading compartment and half of the second compartment carried away.

Third-class carriage second from engine.—Front frame and pannel broken; left side of body stripped, and back end damaged.

First-class carriage third from engine.—Front end knocked in; right trailing axle-box and footstep broken.

Second-class carriage fourth from engine.—Screw coupling broken; left front side chain pulled out with part of the frame.

Break-van fifth from engine.—Left break-frame bar broken across.

The damage to the permanent way was repaired by the putting in of 49 new sleepers and two new rails.

Description.

The precise spot at which this accident occurred is 4 miles 33 chains from the junction of the Cork and Macroom Railway with the Bandon Railway (which junction is about a mile from the Cork terminus), and 1 mile 20 chains from the platform at Ballincollig station. From Ballincollig station towards Cork the line is level for 4 chains, then falls at 1 in 123 for 21 chains, and at 1 in 100 for 33 chains; then rises at 1 in 275 for 15 chains, is horizontal for 17 chains, then falls at 1 in 199 for 6 chains, and at 1 in 150 for 12 chains; 4 chains from the commencement of which last gradient the accident occurred. From Ballincollig station, looking towards Cork, the line curves to the right, with a radius of 45 chains for 20 chains, is straight for 52 chains, and then curves to the left with a radius of 129 chains for 44 chains, in which latter curve, and 28 chains from its commencement, the accident happened.

When the Cork and Macroom line was opened in the year 1866, the permanent way consisted of wrought-iron flat-bottomed rails, weighing 65 lbs. to the yard, principally in 21-ft. lengths, fished at the joints with angle fish-plates. The sleepers were of native larch and Baltic fir, measuring 9 ft. \times 9 in. \times 4½ in., there being seven to each 21-ft. rail; there was a sleeper under each joint to which the angle fish-plates were stated to be fastened by two ½-in. fang-bolts inside, and one ½-in. fang-bolt outside each rail joint; there being also a similar fang-bolt on the inside of each of the two centre sleepers; the remainder of the fastenings consisted of ½-in. spikes, 4¾ inches long, inside and outside the rail in each of the four sleepers which had no fang-bolts, and outside the rail on the two centre sleepers; each 21-ft. rail may therefore be said to have been secured by five fang-bolts and 10 spikes. The ballast was of gravel, stated to have a depth of 10 inches below the under surface of the sleepers.

The super-elevation of the outside rail of the curve of 129 chains radius varied when I tried it, between 1½ inches and 3½ inches, one inch being amply sufficient. The gauge was fairly correct.

The engine which drew the train is a six-wheeled four-coupled side-tank engine, holding 500 gallons of water and two tons of coals, weighing, when in full working order, about 30 tons. The weights on each pair of wheels are not known, and there is no engine weigh-table at Cork. The leading wheels are 3½ feet in diameter, and the coupled wheels 5½ ft.; the wheel base being 12 ft. 4 in., and the wheel centres being equally spaced. The cylinders are 15 inches by 21 inches.

Evidence.

1. *Charles Andrews Carr*, sub-inspector in Royal Irish Constabulary quartered at Ballincollig.—A short time after 9 p.m. on the 8th I was informed that there had been an accident on the Cork and Macroom line, about 1½ miles east of Ballincollig station. I at once went to the spot, and reached it at about 9¾ p.m., accompanied by sub-constable John Neill. On approaching the scene of the accident I was first attracted by the marks on the line which commenced close to the joint to which I directed your attention on the ground. In that joint the eastmost vertical bolt on the inside of the southern rail was pushed outwards about an inch; the western bolt was, I believe, in its hole. I also observed the northern rail curved outwards gradually for some distance. I then went on to help to assist the wounded; and after they had been finally removed, I returned to the place where I thought the train had first left the rails, and examined the line more minutely, and getting a lorry, had it moved eastward, until it fell between the rails some little distance (perhaps four or five yards) from the above-mentioned joint. I observed also some broken bottom flanges in the inside of the northern rail near the joint. I observed also the broken fragment of a sleeper on the southern side, in the slope of the ditch, and I was able to put my stick into another. The broken portion was decayed. I searched particularly for any marks of obstruction, and could find none; and in my opinion there is no foundation for the report that the accident was caused by an obstruction. I have reported minutely upon the subject to-day. My head constable and four

men were on the ground before I arrived. I observed no rail canted.

2. *Thomas McNamara*, head constable stationed at Ballincollig.—I reached the scene of the accident about 9.10 p.m., having heard of what had occurred from the station-master. I first directed my attention to the dead and wounded, with the exception of the driver and boy, who had been removed from the wreck before I arrived. I next sent for medical assistance, and telegraphed to the railway officers in Cork. I then, in company with Mr. Carr, examined the line; and I agree in all he has stated. The last of the vehicles which had formed the train was about 40 yards from the bad joint. Its right wheels and the right wheels of the two carriages in front of it were on the south rail, and the left wheels were inside the north rail. Dr. Leader, A.M.D., and another medical gentleman from Ballincollig, were in attendance at once. I had some conversation with the guard Patrick Downey, who was perfectly sober, and rendering all the assistance he could. I asked the fireman how the accident had occurred, and he said that there was some obstruction on the line. I asked him if he thought it was a stone, and he replied, that I must be a tremendous flat to ask him such a question, and then added some incoherent nonsense, showing that he was not in his right mind.

3. *Daniel Cavanagh*, sub-constable stationed at Ballincollig.—I reached the spot with head-constable McNamara. I was present with Mr. Carr when he

examined the line, and agree with his evidence on that subject. I also saw a bolt out of the first or second sleeper from the joint, on the inside of the north rail. Next morning I saw a gash on the top of a loose rail, which was then lying near the engine on the south side, and I thought that this rail had been removed from the joint to where I saw it lying. About 10 p.m. I saw the boy removed from the engine quite dead. The driver was hemmed in between the fire-box and the coal-box, quite dead.

4. *John Quinn*, constable.—I agree with the evidence of the former witnesses. I particularly searched for obstructions, but could find none.

5. *Frederic Lyster*, manager of the Cork and Macroom Railway since the opening of the line in 1866.—I heard of the accident about 9.30 p.m. and reached the spot with a Bandon Company's engine and tender and carriage. Soon after 10 p.m. I saw the driver, boy, and one of the passengers all dead. The fireman had been removed. I examined the line with a view to ascertaining how the accident had happened. I found the rear vehicle (a break-van) with its off wheels on the south rail, and the rear wheels inside the north rail; the carriage next in front of the van was in exactly the same position; the carriage in front of this had its rear right wheel on the south rail, and the near one inside the north rail; the two front wheels were completely off the line to the left; the first and second carriages in the train were uncoupled from each other and from the rest of the train, and turned over on their left sides. I tried to ascertain the cause of the accident, but could find no mark of any kind on the top of the rail. The displacement that I noticed was on the north rail, which was turned outward. The two rails which were renewed were close to where the engine was lying, and the gash on the top of one of them must have been caused by the left wheels of the engine crossing the rail. I have a general charge of the permanent way, and under me is Overseer John Flynn in more particular charge of it; he has charge of the whole length from Cork to Macroom, 24 miles. Flynn reports to me when he wants materials for renewals. He had not reported this curve where the accident occurred in particular. We renew the bad rails of the light section with the best we remove from those portions where we are relaying the line with heavier rails. I have not much difficulty in getting materials for renewals, but I am ordered to keep expenses down as much as possible. Within the last fortnight we have got 920 new sleepers. There have been some new sleepers put in west of Ballincollig, where we are renewing the line with a rail of over 70 lbs. weight. In this we are using no fang-bolts, nor are we adopting any extra precaution on the curves except near Macroom, where the curves are steep. We have 35 permanent-way men on the line, $1\frac{1}{2}$ per mile. Flynn was permanent-way inspector on the Cork and Bandon line, and came to me about seven years ago. I consider him a competent man and suitable for the position he occupies.

I have only had engineering experience since I came on this line. I was on the Bandon line for 15 years as station master at Bandon, where I made myself conversant with the working of railways.

6. *John Flynn*, travelling ganger on the whole line about 6½ years.—Before this I was in the same position on the Cork and Bandon line from about 1857 to 1872. I was a barrowmaker on the Bandon line for seven years, and then platelayer till the line was finished. After this I was a travelling ganger on the Bandon line for about 15 years, and had general charge of the fencing, &c. I know the part of the line where the accident occurred. Jeremiah Fleming was the ganger in charge of it. I was over that part of the line on the morning of the day with Fleming. I had not been on that part before for six months. Fleming did not point out to me anything particular at the scene of the accident, but he told me he had some bad rails and sleepers, and pointed them out as

we walked along. I cannot say how many. He had asked me then, and previously several times, for rails and sleepers, and I told him I had none to give, but would send them when I had. I had the entire line from Cork to Macroom to supervise, and I had to report to Mr. Lyster in case of bad rails and sleepers. The ballasting is insufficient in parts. Before the accident Mr. Lyster seldom travelled the line. I was at work at Kilcrea about a month. About three months ago Mr. Lyster told me a cargo of sleepers was expected. I don't know what became of that cargo. Sometime afterwards about 1,300 arrived, and were sent to Kilcrea and Macroom. Mr. Lyster told me that they were not to be distributed (though I asked him) till the Board day. I again saw Mr. Lyster the day after the Board meeting for an answer. He told me not to mind for a while. After that I spoke to him again after three Board days, having meantime put in some of the sleepers on my own authority at Kilcrea, Macroom, and, I believe, at Killumney. The difficulty about not issuing them was, I believe, from their being under measurement. They have been since put in. From time to time I have obtained fish-bolts. I got a ton a month or six weeks ago. Fleming often complained to me that the line was in a very bad state. I made these same complaints to Mr. Lyster. All the gangers have complained to me of want of rails and sleepers. I made this known always to Mr. Lyster. These complaints were true. The rails so complained of were dangerous. They were left in the same state for a month or so. About a week before the accident Fleming told me 60 new rails were required, and I gave him 12, all I could afford. I never told anybody that 60 rails were required. He had those 12 some days before the accident. I used to take the train in going to Kilcrea from Cork and back. I told Mr. Lyster that I had walked the line the day before the accident and saw nothing more wrong on the spot of the accident than on any other part. I have got fang-bolts since the accident, but none were used before. It did not strike me that an obstruction might have caused the accident. I have seven gangs of men on the line—one gang of four, and six others of five. My duty is to visit these gangs and get reports from the gangers. During the last six months I had six extra men since April for fencing and other purposes. Mr. Lyster has complained about my having come home from my work too early. He had told me I ought to walk to Ballincollig and not take the train from Cork. I was laying rails at Kilcrea the week before the accident. I do not remember how many of the old rails taken out were fit for further use. There was no stint in the number of new rails I could obtain.

I had not other materials because I could not get them. Mr. Lyster, the manager, did not give them to me, but always promised them. I never told him the line was not safe, but I told him what things were needed; I meant for the safe working of the line. I never made a written report to Mr. Lyster, but I very often made verbal reports to him. I consider that six good sleepers out of seven would keep the line safe. I could not say there were six good sleepers out of seven on the line generally. I saw the bad sleepers taken out where the accident occurred, but I did not count them. There were a few good sleepers there, but not many. Had there been six good sleepers there, I believe the accident would not have occurred. In seven or eight lengths of rails there were about 40 bad sleepers which had to be replaced, but there was only one bad rail in this portion. I got to the scene of the accident about 10.30 p.m. on the arrival of the special train. I did not examine the line till the next morning at day-break. I found the rails out of order. At the joint at the west end of the rail with the broken bottom flange the sleeper was not such a bad one, not altogether very bad. I did not find the defect which caused the engine to leave the rails, nor can I tell what did it. I do not say the rail and sleepers were in good order. Fleming had four men under him on a length of 3¼ miles. They were not constantly em-

ployed on this part of the line. For about two months two had been away putting palings and sidings in at Kilcrea. The five men were scarcely ever there altogether. Sometimes, but not often, on Fair days they would be taken to Macroom for loading cattle; three would sometimes be taken for laying rails, sometimes for shunting at Ballincollig station. They had plenty to do to look after their own proper work. I often complained to Mr. Lyster about their being taken from their proper work; this was verbally. He would make me no answer. I bought the hay on the line from Mr. Lyster for 10*l.*, and saved it by the platelayers labour with his knowledge. Fleming's gang was so employed for about three weeks, *i.e.* 18 days, but not consecutively. No strange men were employed on Fleming's length while his men were making the hay. These men were wanted on Fleming's length for their usual work during this time. I made no report of this nature to Mr. Lyster. The hay making was work that required to be done.

I consider myself responsible for the safe maintenance of the line if I can get the materials. I last spoke to Mr. Lyster about the want of sleepers and rails a short time before the accident. I stated no definite number that were required. I had not walked the line from Ballincollig to Cork for six months previous to the accident because I had not had time. I had made no complaint of want of time to Mr. Lyster. I had rail-laying, fencing, and laying in a siding at Kilcrea to attend to. On the day of the accident I walked from Ballincollig as far as my house, which is a mile west of the junction. I did not count the number of defective rails or sleepers. I never did count them. I have no notion of how many are wanting to put the line in order. I never mentioned any particular number being wanted to Mr. Lyster. I should say there are not six good sleepers out of seven excepting the length from Killumney to Ballincollig, which has been relaid. The last time I asked Mr. Lyster for fish-bolts I got them, and I believe those I got are all in the line. This was a ton. I have asked for none since. I am aware fish-bolts are still deficient, but I have not asked for any fresh supply. I do not know how many are deficient. The rails were supposed originally to be fastened by three fang-bolts with crabs at each joint, and two intermediate, *i.e.* five fang-bolts, with crabs to each rail. There were some—I cannot say how many—not so fastened. I cannot say how many crabs now remain. We used no fang-bolts in the new rails between Killumney and Ballincollig, but we used five-inch spikes. I never drew Mr. Lyster's attention to the fact that there are many rails without fang-bolts. I do not think much of the value of fang-bolts. A new joint sleeper was put in at the west of the first mark; of the rest I am not certain. The joint itself was about half an inch out of gauge. From this both rails were bent outwards, and another inwards. It had not struck me as important to leave the sleepers I had removed in the position they had occupied, but the next morning I received instructions from Mr. Lyster, in presence of the men, not to remove the sleepers from the ground, and I had some brought back which I found the platelayers removing on Tuesday. At Toker I had some sleepers for the Cork end of the line. Since the accident I am not aware of any new rails having been put in in Fleming's length.

I have complained several times to Mr. Lyster about men having been taken from the line for other duties. I did not tell him that the men could not cut the hay and look after the line at the same time. I told Mr. Lyster that spikes held the rails better than fang-bolts, because they filled the holes in the rails better than fang-bolts. We have now got $\frac{3}{4}$ -inch fang-bolts. I asked Mr. Lyster some time ago (perhaps two years) to walk the line, and was angry with him that he did not do it. Mr. Lyster walked the line from Killumney to Ballincollig last February or about that time. I have not seen him walk it since then, but he may have done so unknown to me.

7. *Jeremiah Fleming*, ganger and platelayer for $3\frac{1}{2}$ miles on each side of Ballincollig for the past five years, and at Dooniskey from a year after the opening.—I have four men under me; these men were not always acting as platelayers, being sometimes otherwise employed, being taken from me by the travelling ganger, trucking cattle fair days and shunting waggons at Ballincollig. Some of the rails and sleepers are worn and some good on my length. John Flynn is my superior officer. I would inform John Flynn when I wanted any new material. I did not always get what I asked for, but I had to tell him the quantities I wanted; if I could not get them it was because he had not got them. If I had a good sleeper under each joint and four out of the six intermediate sleepers good, I could work the line safely. I had not this number sound everywhere; several of the rails wanted new sleepers. I had informed Flynn where a rail had less than four good sleepers. I asked for timber. I had walked the length over the scene of the accident about mid-day of the day it occurred, with Flynn, and I showed him defects as we walked along. I did not notice anything wrong there in particular. I had received 160 new sleepers about a fortnight previously, some of which (about 60) had been put in, though none near the scene of the accident. I got to the spot in about three-quarters of an hour after the accident occurred. I found a left rail broken in the bottom flange. All three spikes were in the plates of the southern joint. I saw no mark of a wheel having passed over the south rail. I cannot account for the wheel getting down on the north rail. The south rail began to be bent a little to the east of where the north rail was broken. I noticed nothing wrong with the next joint, but I can give no further description of the state of the road, my attention being otherwise taken up. I cannot say how many new sleepers I put in the broken rail length. I do not know how many new sleepers have been put in where the accident occurred. I did not put in these myself as Flynn was superintending the work. I commence $2\frac{1}{4}$ miles east of Ballincollig and work $1\frac{1}{2}$ miles west. The road to the west was renewed between two and four years ago. I have no idea of the number of bad sleepers from Ballincollig eastward in my length. I have been 11 years on the line altogether. Originally the rails were secured by two fang-bolts with crabs inside, and one fang-bolt without a crab outside; and in addition there were two fang-bolts inside with crabs at the centre of the rail. There are now no crabs on the fang-bolts. I have seen none since I have been in this length. Flynn was aware of this. I have never asked for more men than I have allowed me. I got all that would be allowed. I could have employed more men had they been allowed me. I had not so much to do west as east of Ballincollig. Haymaking would employ two men at a time for six weeks. Flynn ordered me to cut the hay. For putting in rails we borrowed and lent each other men. I last applied to Flynn for timber about six weeks ago and got a supply in a few weeks. I could put in 14 or 15 new sleepers in a day with four men. I had only two men during the fortnight previously to the accident. All the 60 sleepers were put in to the east of Ballincollig. Flynn is the owner of the hay. If the men had not been saving the hay they would have been at work on the line where they were very much wanted. I was continually asking Flynn for sleepers, and got them after some delay. I have complained of not having my demands attended to. Had I got sleepers and rails when I asked for them I should have had plenty of work for all four of my men. I was kept for several weeks waiting for rails to replace others that were not in my opinion safe. This would be three or four weeks before the accident. I asked for 60 rails and got 12. I never complained to Mr. Lyster, except through Flynn, my superior officer. I said to Flynn, in presence of an engine-driver, that the rails were not fit for an engine to travel over them; this was a good time ago. These 12 rails I got were put in to replace the worst ones of the 60.

8. *Patrick Downey*, guard four years with the Cork and Macroom Company, previously eight years in the service of the Cork and Bandon Company.—I left Cork for Macroom with the 5.45 p.m. train on the 8th inst. It consisted of the same number of vehicles as on the return journey, the van having been in front going to Macroom. We reached Macroom punctually at 7, and started back at 7.15 with a train consisting of tank engine, running chimney first, two third-class carriages, one first-class, one second-class, and break-van—five vehicles in all. We started punctually and stopped at Clonisky at right time, Crookstown Road at right time, Kilcrea three minutes late, lost in delay at Crookstown, Killumney three minutes late, and Ballincollig three minutes late. We left Ballincollig at 8.12, where we had collected tickets. I had some conversation with the driver at Macroom about some cattle waggons; he was then perfectly sober. We overran none of the stations. When we left Ballincollig only the driver and fireman were on the engine. I am sure there was no one else. Some conversation occurred between the station-master and driver as to letting a man ride into Cork, he (the driver) paying his fare, but the station-master persuaded the driver not to do it. A lamp boy, who, had been out with me in the van to light the carriage lamps, was returning with me in it, but no one else. The third-class carriages were quite full, 50 in each carriage; there were two first-class passengers, and about 32 in the second-class carriage. I noticed nothing unusual after leaving Ballincollig, until the van appeared to strike some object in front of it. I went to the break as quick as possible, and I got it partly on before the van came to a stand very suddenly, just before which I was thrown flat on my back in the doorway separating the break-compartment from the luggage-compartment. I was hurt in the hip, but have not been away from duty. I got up immediately. I had no watch on. I found the following the position of the train: the engine turned over on its right side, in the ditch on the right of the line; the two third-class carriages next it turned over on their left sides on the left of the line, both beyond the engine, but still connected by one of the side chains. The two front wheels of the first-class carriage were pulled across to the left, and the rear wheels were off the rails inside these. This carriage was opposite to the engine, disconnected, I believe, from the third-class; the second-class remained coupled to the first-class, but with all its wheels off the rails and inside them; the van was off the rails, all four wheels inside them, the coupling chain off, but the side chains holding; the break-rod on the left was cracked. After letting the passengers out of the second-class carriage, I went to the left side of the engine, but at that time I could see nothing of the driver or fireman. I then went to the right side, but not being able to get on to the footplate, I got on the engine by the hand-rail and found a man with his head and shoulders sticking out; this was the driver, who was quite dead. I then went back to where I thought the train had left the rails, but I could find no obstruction on the line. On coming back I saw the fireman being carried away from the engine, who made some remarks showing he was sensible. In reply to my questions as to how it had happened, he said he thought there must be some bad neighbours or friends. I then attended to the injured passengers. I do not know in what part of the train the deceased passengers were riding. The worst of the injured were in the carriage next the engine. I do not think there was any unusual speed just before the accident. I had heard the whistle blown just before coming to the Curagheen overbridge; our usual speed at the place

is from 25 to 30 miles an hour. I have never had to complain of the deceased driver Ratteray running too fast. I had worked with him for four years. There had been no unusual speed between Macroom and Ballincollig the evening of the accident. We are allowed $1\frac{1}{2}$ hours for $24\frac{1}{2}$ miles; about a quarter of an hour of this would be taken in stopping at the stations. The moment the accident happened I sent word back by a soldier to Ballincollig to give information, &c.

9. *Jeremiah Clifford*, station-master at Ballincollig for two years.—I had a conversation with driver Ratteray while at the station on Sunday evening. He came to me on the platform with a man named Nash, and asked that Nash might go in the train, and that he (Ratteray) would pay his fare, Nash having no money. I advised him not, as the man was stopping about every Sunday night. Nash afterwards came to me with the fare, and went by the train. I believed the driver to be perfectly sober. I did not smell him of drink. I have known him since 1866, except for two years when I was away. He has been always a sober man, and attentive to his duties. I never saw him the worse for drink. I saw the fireman after the accident. I thought him also to be sober. I asked him did he know me, and he said yes. I asked him how he thought it had happened. He said it must be stones, it must be stones (repeating this twice). I asked him, "Had you any drink to-day?" He replied, "I had a bottle of stout in Cork, and a pint of porter in Macroom." He did not smell of drink. He also said that the driver had only, to his knowledge, had a pint of porter in Macroom. I saw Mr. Carr on the lorry when it went off the line where the engine had done the same. I could see no stone or obstruction anywhere. The lorry got off with its northern wheels a little east of the joint of the first broken rail. My opinion was that the accident must have been due to an obstruction or to furious driving, as I thought the sleepers were sufficiently good to have held the train. Fleming's gang had been employed for $13\frac{1}{2}$ hours since January last in shunting at Ballincollig. Sixty sleepers had arrived about a fortnight before the accident, and Fleming could have removed these at any time he wished. There is only one porter now at Ballincollig, both as gateman and porter.

10. *Vincent Conran*, driver since 1866 on the Macroom line.—I know ganger Fleming. I have complained to him about the condition of his length—generally of the state of the rails and sleepers, and once of the packing. The last time was a few weeks ago, about some bad rails near Reardon's crossing. He said he would put in others when he could get them. I then spoke to Flynn about it, and after this some better rails were put in. I thought an accident might occur from the defects. I reported the line in bad order and dangerous. I grumbled about the state of the line to the other gangers. I have twice reported the defective state of the line; twice in the last six months to Mr. Lyster; the last time a fortnight or so before the accident, especially as regards bad rails. He said, "We are going to get new rails next week." Our highest speed would not exceed 35 miles an hour. I told Ratteray (the deceased driver) I should take my time (in running), whatever he might do, and he said he would do the same. This was in the early part of the summer. The line has been getting into its present condition for 6 or 7 years. I have never noticed a tendency of the engine wheels to press against the inner rail of the curves, rather than the outer, on account of the great cant.

Conclusion.

From a careful consideration of the evidence and an examination of the line, I have come to the conclusion that the accident is to be attributed to the defective state of the sleepers at the spot where the engine first left the rails. The first mark of a wheel having been off the rails is on the inside of the north rail, 90 yards east of a small

stream bridge. The bottom flange of this rail is broken from the fourth sleeper east of the joint, evidently by the flange of a wheel having dropped inside the rail. In the north rail next to the east, the bottom flange is also broken on the inside as far as the third sleeper. Three good sleepers then appear to have kept the north rail nearly in its place, and it is here that there is the faint track of the right wheels (probably of the engine) having mounted the south rail, and shortly after this the wheel marks on the sleepers become distinct. Under the first length of rails alluded to, there are now four new sleepers put in since the accident, the three old ones left in not being thoroughly sound. Unfortunately there was no means of identifying the four old sleepers for which these four new ones had been substituted; but looking to the general condition of the 49 old sleepers which had been removed, I am of opinion that the fastenings had not sufficient hold to resist the pressure of the engine wheels in running round the curve, but that they allowed the rails to spread, and the left wheels to drop inside the left rail. The undue super-elevation given to the outer rail, in some cases as much as $3\frac{1}{2}$ inches instead of one inch, would also, no doubt, cause undue pressure to be brought on the inner rail of the curve. There was also a complete absence of fang-bolt fastenings in most of the sleepers which I examined, although, according to the original construction of the line, there ought to have been three to each rail joint, and two intermediate ones.

There was nothing in the condition of the engine and carriages which composed the train to account for the accident. The engine is in a good state of repair both as regards tyres and springs. One of the axles was slightly bent, and a leaf of one of the springs broken, both, no doubt, consequences of the accident.

There is no trustworthy evidence by which to ascertain the probable speed at which the train was running at the time of the accident. The guard does not consider that it was anything unusual. The deceased driver, Ratteray, had been on the line since it was opened. He was a steady, sober man, and there is no reason to suppose he was under the influence of drink on the evening of the accident. He had never been complained of for fast driving.

The condition of the Cork and Macroom line having formed the subject of a separate report, I need not enlarge upon it here further than to point out that between the junction and Ballincollig, a distance of $5\frac{3}{4}$ miles, I counted 113 defective rails, and nearly 3,000, or about 29 per cent., of defective sleepers, 45 of these rails and 1,180 of these sleepers occurring in the length, $2\frac{1}{4}$ miles, where the accident occurred, of which length Fleming is the ganger. Had Fleming not brought this state of things to the notice of his immediate superior, John Flynn, the travelling ganger over the whole line, he, Fleming, would, no doubt, have to bear a portion of the responsibility of this accident; but as he appears to have done so, and to have put in new materials as he was supplied with them according to the best of his judgment, I cannot consider him responsible for not having repaired the particular spot where the accident occurred, seeing that there were many others just as much requiring it throughout his length.

With Flynn the case is different. He, no doubt, did occasionally press for a supply of new rails and sleepers, but as, by his own admission, he had not walked the line between his house (a mile west of the junction) and Ballincollig for about six months until the morning of the accident, he must be held to have most deplorably neglected this most important duty without any adequate excuse.

As the question of responsibility for the supply of the necessary materials for the safe maintenance of the line will shortly form the subject of judicial investigation, at will hardly be well for me to enter on it here. The line had evidently been allowed to fall into a bad state of repair, probably without the danger incident thereto having apparently been realised by those concerned.

It is only upon the assumption of the fact of the line being in a dangerous condition not having been realised that it is possible to account for the traffic manager (who also acted as engineer) having, so recently as July last, signed the certificate to the effect that during the preceding half-year the permanent way had been maintained in good working condition and repair. If a short line, such as the Cork and Macroom Railway, is unable to support the expense of a resident engineer, it would at any rate seem to be the duty of the directors to have the line inspected by a qualified engineer once in six months, prior to the certificate respecting the permanent way being forwarded to the Board of Trade.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on 11th December 1878.

GLASGOW AND SOUTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., 30th November 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 18th instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 12th instant at Barassie junction, on the Glasgow and South-Western Railway.

In this case, the 8.15 p.m. express passenger train from Stranraer to Glasgow, consisting of engine, tender, three carriages, and a break-van (running three-quarters of an hour late, owing to the steamer from Larne having been detained), overtook and ran into a mineral train, consisting of engine, tender, 42 waggons, and a break-van, which was pulling up at Barassie junction.

Four passengers were injured, but not it is believed seriously.

The driver and guard of the passenger train received slight contusions.

The engine and tender of the passenger train were thrown off the rails, and also the front wheels of the first carriage, but without receiving much damage. The engine broke down a portion of stone wall fencing about 40 yards from where it left the rails. In the mineral train the rear van and three waggons were more or less broken up.

Description.

At Barassie junction the lines to and from Kilmarnock and the Troon Harbour branch join the lines between Glasgow and Ayr. The points and signals are properly interlocked, the signal-cabin being situated on the west of the line, close to the facing-points on the down line.

The down home-signals are 120 yards south of the cabin, and the down distant-signal is 480 yards south of the down home-signals. Troon station is 1 mile 4 chains south of the junction, and the line for a short distance south of Troon to the junction is perfectly level and straight. The next station south of Troon, and 2 miles 38 chains from it, is Monkton; then Prestwick, 74 chains south of Monkton; and then comes Falkland junction (from which the mineral train started), two miles south of Prestwick. Troon, Monkton, and Prestwick were at the time of the collision provided only with distant-signals, and block working was not in force.

The collision occurred at 11.22 p.m. 150 yards outside Barassie junction down home-signals, or 330 yards inside the down distant-signal.

Evidence.

1. *Robert Crawford*, goods porter at Troon since the middle of October, previously goods porter at Kilmarnock for four years.—I was on duty on the night of the 12th instant, in charge of the signals. I remember the goods train passing at 11.18 p.m.; the signal was off for it, and I put it to danger when it was past. I knew nothing about the passenger train, which was over due, till I saw it coming near the farmhouse by the over-bridge. I did not hear it whistle. Seeing that the goods train had passed Barassie distant-signal, and knowing that it was going on to the branch, I lowered my distant-signal before the passenger train was through the bridge, and it passed at 11.20. I gave the driver no light at all. I was standing on the platform with a lamp in my hand. The speed was as usual. The goods train was showing good tail lights, but I cannot be certain whether there were three or not. After the passenger train passed I came into the office and booked the time. I did not notice the Barassie signals to see whether they were off or on. It was a clear night. I did not hear the collision occur, and was not aware of it till the next morning. The rule is to keep the distant-signal at danger five minutes. I did not know whether the goods train would shunt while standing this side of the junction or the other side of it.

2. *Robert Andrew*, signalman 10 years, all the time at Barassie junction.—I came on duty at 6 p.m. for 12

hours. I work block to Irvine, but not in any other direction. I knew nothing about how the express train was running and had asked the goods guard of the train leaving Ayr at 10 p.m. if he knew. He said they could not get any news of it at Dailie when they left Falkland junction. I shunted this train on to the up line to wait till the express passed. I next asked for the block from Irvine for the main line, and having got it, lowered my signals for the express, viz., the distant, home, and starting signals. I then saw a train coming in sight from a little the other side of Troon, but I was not at first sure what it was; but as soon as it had passed the distant-signal I knew it was the mineral train by the speed. I allowed the train to come forward with the signals still off for the main line as I wanted to ask news of the express. I never heard the mineral driver whistle for the Kilmarnock road, but I knew he wanted to go on to that line. I wanted to see whether there was time for the mineral driver to shunt some waggons into a siding leading from the main line before the arrival of the express. After putting the distant-signal up, which I did, I believe, as soon as the train was inside it, I put up my home before asking the mineral driver where the express was. I think he said it was 45 or 50 minutes late. Just at this time the mineral engine broke away from its train, owing no doubt to the passenger train having run into the van. I put the starting-signal to danger directly after the home-signal. The mineral engine

had not fully stopped at the time of the collision—which took place at 11.22. The goods train had arrived at 10.31. An engine-keeper was in the cabin with me at the time.

3. *Robert Sillars*, signalman at Falkland junction.—I have been eight years employed as signalman, three years at Hawkhill junction, three years at Newton junction, and two years at Falkland junction. On the night of the 12th November I took duty at 6 p.m. The mineral train, which is booked to start from the junction at 10.30 p.m., did not arrive from the goods yard until 10.43 p.m. The train was left in the goods branch, and the engine came forward and put off some empty waggons in the sidings, and afterwards went to the turntable to get turned. On arriving from the turntable the fireman stepped off and asked me if the boat train had passed yet? I replied that it had not passed, that it was 45 minutes late. He asked if I would allow them to get away in advance, and I replied yes. I lowered the home-signal for the mineral train at 10.54 p.m., and the rear of the train passed the cabin at 10.57 p.m. I did not see the guard in charge of the mineral train until the break was passing the cabin, when I handed him a circular regarding a special train. At 10.34 p.m. I got a telegraph message from Daillie station stating that the 8.15 p.m. passenger train had passed there at 10.30 p.m., 45 minutes late. At 11 p.m. I received a message from Dalrymple junction stating that the 8.15 p.m. passenger train had passed there at 10.57 p.m., 44 minutes late. The passenger train passed here at 11.12 p.m., 44 minutes late. My out-door signals were all clear for this train, I being warned of its approach from Newton junction. The block telegraph is in operation between Falkland and Newton junctions, the distance between them being less than half a mile. I exhibited no hand-signal to the driver of the passenger train when he passed. I am aware that it is my duty to inform the guards of mineral and goods trains as to the running of passenger trains, and I do so daily, and intended to inform the guard of the mineral train on the night in question when the van passed the cabin; but when he asked me the question regarding the circular which I handed to him I forgot it for the moment, and when it returned to my memory the van was too far away for the guard to hear me. There was an interval of 15 minutes between the departure of the mineral train and the passing of the passenger train.

4. *Kenneth Kerr*, signalman at Prestwick station.—I have been employed at this station as signalman for the last 12 months; previous to that I was a considerable time employed as platform porter at Dumfries. I had charge of the signals on the night of the 12th November, having taken duty at noon of that day. The night was clear, with a strong easterly wind blowing. The 10.30 p.m. mineral train, Ayr to Hurlford, passed this station with clear signals at 11.8 p.m., running at the usual rate of speed. I put the down distant-signal to danger when the engine of the train had passed it, and it remained in that position for fully six minutes, when I turned it off to clear. When the mineral train passed, I looked through the office window from the outside, and took the time from the inside clock, and it was 11.8 p.m. I did not leave the platform from the time the mineral train passed until I turned off the distant-signal, when I returned to the office and recorded the time in the train book, and I had only been a few minutes there when I heard the passenger train approaching. I hurried out of the office with the intention of exhibiting a caution hand-signal to the driver, but I was too late, the train passing just as I reached the platform. I looked at the outside of the clock this time, and it was then 11.16 p.m. The direction in which the wind was blowing prevented me from hearing the approach of the train any earlier. The passenger train is due to pass the station at 10.29 p.m. At 10.20 p.m. I received a message from Ayr, stating that the passenger train

was 48 minutes late leaving Girvan, and it passed this station 47 minutes late. I also recollect that on this date there was a difference of two minutes between the inside and the outside of the station clock; the inside hands were two minutes in advance of the outside ones. I took the time of the passing of the mineral train from the inside, and the time of the passing of the passenger train from the outside, therefore had I recorded the time when the mineral train passed from the outside dial it would have been 11.6 instead of 11.8, as the train time book shows. The outside hands recorded the correct time, and my reason for taking the time from the inside was that from the place where I was standing when the mineral train passed I had only to turn round to see the inside face of the clock through the office window, and I had forgotten at the time that there was a difference between them. This discrepancy of the time between the inside and the outside of the clock did not come to my recollection till the second day after the collision. I know that 10 minutes is the stated interval at which a goods or mineral train is to be allowed to precede a passenger train, and my explanation for not shunting the mineral train is that I considered it had sufficient time to be clear at Barassie junction, and there would have been nine minutes of an interval if the train had been running to the telegraphed time.

5. *William Edington*, signalman at Monkton station.—I have been employed as signalman at this station for the last eight months, previous to that time I was 5½ years at Lynedock Street station, Greenock, one year employed as signalman, one year as porter, and 3½ years as ticket collector; I was also two years at Greenock Harbour, employed as number taker. On the night of the 12th I was in charge of the signals at this station, the 10.30 p.m. mineral train from Ayr passed at the usual rate of speed at 11.10 p.m., I turned the signal to danger behind this train, and it remained in that position until 11.16 p.m. when I turned it off. I knew that the 8.15 p.m. passenger train from Stranraer had not passed, but I had no means of knowing how much this train was late, it is booked to pass this station at 10.31 p.m. I was on the platform and heard the passenger train approaching and I looked at the clock to see what time had elapsed from the passing of the mineral train, and whether it would be necessary to exhibit a caution signal to the driver, and as nine minutes had elapsed I was of opinion that the mineral train had sufficient time to be clear at Barassie, and I exhibited a white hand-signal to the approaching train, waving it gently from side to side. I am quite certain that I recorded the correct time in the train time book of the passing of both trains, as was shown by the station clock, which is regulated daily by the guard of the 10.35 a.m. train from Glasgow; I am aware that 10 minutes is the interval stated in the rules at which a passenger train is to be allowed to follow a goods train, and I do not recollect of having on any previous occasion violated this rule. The tail lights of the mineral train were burning brightly when it passed.

6. *George Richmond*, mineral driver 4½ years.—I started from Falkland junction, Ayr, with the 10.30 p.m. train for Kilmarnock. We left at about 10.55 or 56, having been late in arriving. I heard that the express train was 45 minutes late, it being due to pass Falkland junction about 10.28, and I thus thought I was at least 15 minutes in front of it, and that there would be time to get off the main line at Barassie junction, six miles off, before it overtook us. Rule 115 says that mineral trains should be shunted 10 minutes before fast passengers are due. I could have shunted at Prestwick, Monkton, or Troon, but received no instructions to do so from the guard, and got clear signals all the way along. I left Falkland junction by signal with 12 loaded and 30 empty waggons, and a break-van. The fireman only was on the engine. We had some waggons to leave at Barassie. The distant-signal was off as we approached

Troon, and as we approached Barassie I saw all three signals off for the main line. I whistled twice for the branch, once at the distant-signal and once between the home and distant signals, my wish being to get on at once to the branch out of the way of the express. Had this not been so I should have been content with the signals as they were, as I had to shunt into a siding joining the main line, on the Glasgow side of the junction. The wind was blowing strong away from the signal-cabin towards Troon. I did not notice when the signals were put up to danger. I was drawing in slowly, and let my engine run over the junction points, not being sure what information the signalman might have got, and I was all but stopped when the collision occurred. It caused my engine and two waggons to break away from the rest of the train. We were struck just as the signalman spoke to me. He said he had thought my train was the passenger train.

7. *Joseph Bell*, fireman two years.—Agrees with the driver's evidence, and adds that he saw the porter at Troon by the office door.

8. *Robert Hogg*, goods guard five years.—I started from Falkland junction with a train of 42 waggons and a van, having first to stop at Barassie. We left, half an hour late, at 11 p.m., not knowing whether or not the express had passed, but believing it had passed. Not knowing this I gave the driver no instructions to shunt. We got clear signals along the road, but at Barassie they were off for the main line. I heard the driver whistle twice for the branch when the whole train was inside the distant-signal, but the signals were not altered. I could not say whether the distant-signal was put to danger, but the home-signal was off for the main line when the passenger train struck my train. We were a good bit inside the distant-signal when Assistant Guard Wilson happened to look round and said there is something coming, upon which we both jumped out at opposite doors. The centre of the passenger train was about opposite to us when it stopped. Its speed appeared high, ours was about four or five miles an hour. We were neither of us hurt. I heard no whistle from the passenger train. I could not say whether any means were being taken to stop the passenger train. I had on one tail lamp and two side lamps at the front end of the van. They were knocked out by the collision. About six waggons were more or less damaged, the van was knocked to pieces. I am aware that by rule 207 I am responsible for shunting out of the way of a passenger train. I am sure the lamps were all burning when the collision occurred.

9. *William Wilson*, goods guard 10 months, assistant guard with mineral train.—Agrees with Hogg's evidence.

10. *William McKnight*, guard 12 months, goods guard nine years.—I started from Stranraer at 9.3 p.m., 48 minutes late, waiting for the Larne steamer, which

was late owing to stormy weather. The train consisted of engine and tender, second-class carriage, two composites, and a break-van, in which latter I was alone. We last stopped at Ayr, and left it at 11.10 p.m., 45 minutes late, with about 20 passengers. The signals were clear all along the road, including the distant and home-signal at Barassie. I did not observe any hand-signal at Troon, as the smoke and steam was blowing across, it being pretty windy. I knew of no impediment being in the way till we struck the mineral train. Our speed on passing Troon was 40 miles an hour, and I noticed no check. I was sitting on the seat looking out on the left-hand side, but saw nothing of the tail lights of the mineral train, nor any signal put to danger. My head was a little cut by hitting it against the side of the van. I was off duty a few days. I do not know the time of the collision, having been stunned for a few minutes. The front wheels of the second-class carriage were off the rails. I did not observe Barassie distant-signal after passing Troon.

11. *Robert Fraser*, driver about 24 years.—I was driving a 4-coupled 6-wheeled engine and 6-wheeled tender, provided with the usual tender break; but there were no continuous breaks on the train. We left Stranraer about 9.5 p.m. Nothing unusual occurred up to Ayr. After leaving Ayr we got clear signals all the way. The Troon signal was off as I approached it, and I got a white signal waved to me from Troon platform. I first saw Barassie signals about Troon bridge, all three off for the main line. I kept sight of them all the way along, and I did not see one of them changed up to the time of collision. On coming very near the distant-signal I saw at first two and then three red tail lights, looking a long distance off, not at all this side of the junction. On seeing them I reversed, I believe, against steam, and whistled twice for the breaks. My fireman got to his break, and I believe speed was reduced from 40 to 20 miles an hour before we struck. The mineral van was in motion. I saw the two guards jump out just before we struck. We neither of us attempted to jump off. The engine went off the road to the left (and also the tender slightly) and broke down the stone fence. I was thrown about on the foot-plate as also the fireman. I was not much hurt, and was only one day off duty. No couplings gave way. I at first thought that the red lights were on the other road, but this was only for a moment. The wind was blowing right along the line, and it might have been the smoke of the mineral engine that prevented my seeing the tail lights as soon as I might have done.

12. *George Bailie*, fireman six years.—I agree with the driver's evidence, except that I saw no red tail lights, though I did see the white lights of a train on the other line. I could not tell whether I got my break on or not. I was thrown against the fire-box but was not hurt, and have not been off duty. I stood on the left side of the engine. I had not been firing since passing Troon distant-signal.

Conclusion.

The immediate cause of this collision was neglect of duty on the part of Goods Porter Crawford, who when in charge of the signals at Troon on the night of the 12th instant, took off the down distant-signal for the express train, although he acknowledges that the mineral train had passed Troon only two minutes before the express train, the rule being to keep the distant-signal at danger for five minutes after the passing of a train, and to show a caution hand-signal for a further five minutes. The only excuse that Crawford makes for the gross violation of this rule is that when he saw the express train coming he noticed that the mineral train had passed the junction distant-signal, and concluded that it would have passed on to the Kilmarnock branch before the express train reached the junction (about a mile from Troon). As the night was perfectly clear he might have seen, had he looked, that the junction down home-signal was off for the main line and not for the branch,

and also that the mineral train was pulling up at the junction, where it was in the habit of shunting, and upon these two points he ought to have made himself thoroughly informed before venturing to give an all-right signal to the express train.

Next, there was want of prudence on the part of Signaller Andrew at Barassie junction, who, in ignorance as to where the express train (running nearly 45 minutes late) was, stopped the mineral train on the main line with the signals off, to make inquiries of the whereabouts of the express, instead of hurrying the mineral train on to the Kilmarnock branch.

Edington, signaller at Monkton, also transgressed the company's rules in not giving the driver of the express train a caution hand-signal, although it passed Monkton only nine minutes after the mineral train.

Kerr, signaller at Prestwick, is still more to blame than Edington, for he knew by telegraph how late the express was running, and when he decided not to shunt the mineral train—which passed only, as he thought, nine minutes in advance of the telegraphed time of the express—the least he should have done was to have made sure of being on the platform to give the driver a caution signal, instead of being in the office when the train passed.

Sillars, the signaller at Falkland junction, showed great want of judgment in allowing the mineral train to start only 16 minutes in front of the telegraphed time of the express train, and he was also much to blame for not having informed the guard of the mineral train as to how the express train was running.

I hardly think the driver of the express train can have been keeping a particularly good look-out after passing Troon station, or on a perfectly straight line and clear night, he must have seen the red tail lights on the van of the mineral train long before he did. Seeing the junction home and distant-signals off, as he thought, for his train, no doubt threw him off his guard, but still nothing can excuse drivers for not keeping a most careful look-out when approaching junctions.

This collision would have been prevented had the traffic been worked on the absolute block system. Preparations were being made for introducing it at the time of the collision, and if not already introduced, it will be very shortly on this part of the Glasgow and South-Western Railway.

A good continuous break under the driver's control would have also mitigated the effects of the collision, had it not entirely prevented it.

*The Secretary,
(Railway Department),
Board of Trade.*

I have, &c.,
C. S. HUTCHINSON,
Major-General R.E.

Printed copies of the above report were sent to the Company on the 28th December 1878.

GREAT EASTERN RAILWAY.

SIR,

Norwich, 2nd January 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 21st ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 25th November, near Middle Drove station, on the Lynn and Wisbeach line of the Great Eastern Railway.

In this case, as the 1.55 p.m. up passenger train (consisting of engine and tender, four coaches, a guard's van, and a carriage truck) from Lynn for March was proceeding on its journey, the third and fourth coaches from the engine left the rails about 280 yards on the up side of Middle Drove station (where the train had not stopped), the train being brought to a stand in a distance of 450 yards from where the vehicles first left the rails, without any couplings having been broken.

Three passengers have made complaints of having been injured.

In the two coaches which left the rails, five axle-boxes and two footboards were broken.

In the permanent-way, one rail (where the carriages first left the line) 15 feet long was broken into seven pieces; 50 chairs were broken; and one sleeper was cut in halves.

Description.

In the immediate locality of this accident the line (which is single) is perfectly straight and practically level. The permanent-way consisted at the time of the accident of double-headed wrought-iron rails in 15-foot lengths, which weighed originally 65 lbs. to the yard, and were laid about 33 years ago; they have since been turned several times; they were originally fixed in joint chairs, but in 1868 were fished at the joints. The chairs were of cast-iron, weighing 23 lbs., and the sleepers—some half-round, and others rectangular—measured 9 feet \times 9 inches \times 5 inches, there being five sleepers to each rail length.

The line was being relaid with new steel rails at the time of the accident, and the relaying operations had then extended nearly to the spot where the accident took place. Since the accident the whole of the old rails on this part of the line have been replaced by new steel rails.

Evidence.

1. *John Roughton*, foreman platelayer from the 99th to the 102nd mile, including the length between Middle Drove and Smeeth Road stations.—I had walked my length about 8 a.m. on the morning of the accident. I observed nothing wrong at the spot where the rail was afterwards found broken. A relaying gang of some 16 or 17 men were working all the morning on the Middle Drove side of the broken rail, there being only about 40 feet from where the relaying then ended to the broken rail. The local up goods train passed the spot about half an hour before the passenger train. Nothing attracted my notice with that train. I have no reason to think that the goods train broke the rail. The goods train passed at a speed of about 20 or 25 miles an hour, the state of the relaying permitting such a speed. I am not aware that anyone passed over the position of the broken rail after the goods train passed and previous to the passenger train passing. The passenger train approached at a speed of 20 or 25 miles an hour, steam having been shut off about a quarter of a mile on the other side of Middle Drove station. I did not notice the train after it had passed, but was attracted by a crash as the train crossed the bridge about 200 yards from the broken rail, and on looking forward I saw part of the train off the rails. I then went on towards the train, and as I passed along I saw a broken rail on the left of the line; the pieces were all then in the chairs, but there were spaces between some of the pieces. The fishplates at the ends of the broken rails were either broken or loose. Three or four days previously to this the fishplates at the Lynn end of the rail had been moved to allow of a 20-ft. closer being put in, and the fishplates were after this properly bolted with four fishbolts. I then went on and found all the planks on the middle and left side of an under-bridge stripped and broken, and the sleepers on the Wisbeach side of the bridge cut in halves in the middle of the 4-ft. space. When I came up to the train, which was standing a little beyond the down distant-signal, I found the two hind wheels of the 4th last vehicle were off the rails to the left; the 3rd last vehicle was off to the left with all its wheels, and the van and carriage truck were on the rails. No couplings were broken or disconnected. The 50 broken chairs were distributed along the whole 450 yards from the broken rail, mostly on the left side. I cannot say whether I had turned the rail, which was broken. It looked right enough as far as I could see. All the broken pieces had fresh surfaces. The top was smooth, but the bottom was spread.

2. *George Wilmot*, labourer, employed in relaying near Middle Drove the day of the accident.—I was working near the station when the goods train passed, and was at the same place when the passenger train passed. Hearing a lad shout, and then seeing the smoke from the engine, I noticed that part of the train was off the rails. I then proceeded with a trolley to lend assistance, and came to a fractured rail which was broken into seven

pieces. The first fracture was about 18 inches from the joint next the station, the two fishbolts being broken; then came five small pieces, and then next the joint at the Smeeth Road end was a piece 6 feet long. I don't know how the fishbolts were at that end. I could not see why the rail had broken. We put another rail in at once.

3. *William Emery*, labourer, employed in relaying.—I helped to replace the broken rail. The fishbolts were not broken at the Smeeth Road end of it.

4. *Isaac Brown*, driver 18 years.—I started from Lynn on the 25th ult. with the 1.55 p.m. passenger train for March. It consisted of engine and tender, four carriages, van, and carriage-truck. We stopped at Magdalen Road, but not at Middle Drove station. We slackened about a quarter of a mile from Middle Drove station by permanent-way green signal, on account of relaying operations. We had passed the station and were running at a speed from 20 to 25 miles. I was standing on the right-hand side of the engine, and had just put on steam, after having had it shut off, when my attention was attracted by the fireman, who was looking backwards on the left-hand side, and who said "Hold on." I then looked back myself and saw dust, timber, and ballast flying, upon which I shut off steam, and gradually stopped with the aid of the tender-break. I did not reverse, but only put my lever into middle gear. I felt nothing to indicate that I had run over a broken rail, but only the difference between passing from new on to old rails. I stopped a little beyond the down distant-signal. I did not go back. I did not observe anything particular in passing over the bridge. I did not notice any large quantity of smoke issuing from the funnel, but my mate had been recently firing.

5. *William Cave*, fireman 11 years, certified to act as driver.—The driver shut off steam a short distance before reaching Middle Drove, and we passed the station at a speed about 20 miles an hour. I put my break on at the time. I felt nothing as I passed the spot where the rail was afterwards found broken, except the usual feeling in passing off a new on to an old road. We were running engine first. I was standing on the left side of the engine, and on my mate putting on steam on leaving the new road, I looked back as soon as I could, and then saw that the van (as I first thought) was off the rails. I then told the driver to hold on, applied my break, and we stopped as soon as we could. I continued to look back, and then saw that two carriages were off the rails. I saw them cross the bridge, but they did not seem to oscillate so much then as afterwards. I had last fired about one mile from Middle Drove.

6. *Robert Rushbrook*, guard 14 years.—I was in charge of the 1.55 train from Lynn for March, consisting of four coaches, guard's van, and carriage truck. I was alone in the van. We started punctually

and were running to time. Our speed through Middle Drove was from 20 to 25 miles an hour, having been slackened for relaying. At the end of the relaying I felt a fearful jerk, and at first thought my van was off the rails. I at once applied by break, and then looked ahead, when a piece of timber (I believe from the

bridge) struck the left side of the van ; the van then got buffer locked, and jumped about a good deal till it stopped. The couplings and side chains were all right; there were six wheels of two carriages off the rails. The train stopped at 2.14, and the line was cleared at 4.

Conclusion.

There is every reason to believe that this accident is attributable to a broken rail on the east side of the single line, 280 yards on the up side of Middle Drove station. After the accident this rail, originally 15 feet long, was found broken into seven pieces, the shortest about nine inches, and the longest about six feet in length; these two pieces were the only ones forthcoming at the inquiry, the remainder having, it is stated, been sent to the scrap heap. It is to be regretted that all the pieces had not been kept, as a sounder judgment could then have been formed of the state of the rail. The shorter of the two pieces (which was stated to have been the second from Middle Drove) had its top end next Middle Drove bevelled off, denoting that it had been passed over, after fracture, by a number of heavy vehicles; as the bevelling was more than would have been produced by the passage of the vehicles of the passenger train, supposing the rail had been broken by its engine. It is therefore probable that the engine of the previous goods train, which had a weight of nearly 12 tons on its heaviest pair of wheels, broke the rail at any rate at this one spot, and that the bevelled surface was produced by the passage of the waggons of the goods train. The engine, tender, two vehicles, and the front wheels of the third vehicle of the passenger train passed in safety, but the rail then appears to have got displaced and, probably, further broken, so that the three following rear wheels could not keep on it, though, curiously enough, those of the two last vehicles (a van and carriage truck) were not thrown off. The train was then brought to rest in a distance of 450 yards without further mischief having occurred. It was most fortunate that the couplings held in the way they did, or otherwise, in passing across the open planking (which was destroyed) of an under stream bridge 200 yards from the broken rail, a most serious accident would have occurred.

The cause of fracture of the rail is not far to seek. It was laid 33 years since, and then weighed only 65 lbs. to the yard. Since this time it had been turned several times, and must have lost a great portion of its original elasticity, though, strange to say, its weight (judging from the two existing pieces) had been reduced only about $3\frac{1}{2}$ lbs. per yard. It was evidently no longer fitted to bear the weight of the heavy engines that are now running on the line.

I am informed that there are still 13 or 14 miles of the same section and age of rail in the eight miles of double-line between March and Wisbeach, and that of these, six rails have been broken in the past six or seven months. No time should certainly be lost in relaying this part of the line before the occurrence of some still more serious accident than the present again draws attention to the worn-out condition of the rails.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on the 30th January.

GREAT NORTHERN RAILWAY OF IRELAND.

SIR,

Dublin, 6th November 1878.

In compliance with the instructions contained in your minute of the 22nd ultimo, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the collision that occurred on the 11th ultimo at Navan station on the Great Northern Railway of Ireland.

The 5 p.m. express train from Dublin to Navan viâ Drogheda ran into a special train of waggons that was being shunted at the station.

Some passengers are reported to have been shaken, and the guard of the passenger train was knocked down senseless in his van and cut in the forehead. The fireman was slightly hurt.

The engines of both trains and one passenger carriage were slightly damaged, but no vehicles left the rails.

The railway is a single line. It approaches Navan station from the south on a curve of half a mile radius, and on a falling gradient of 1 in 623. Navan station is protected with the ordinary signals. The down home-signal is at the north-west end of the station, and the down distant-signal is close to a bridge over the railway and about 650 yards from the home-signal. It can be well seen by an engine-driver coming from Drogheda for a mile before he reaches it. The home-signal is seen as he arrives at the bridge where the distant-signal is, and for about 240 yards after passing the bridge. It is then hidden for the next 100 yards by the ventilator on the engine shed, when it again comes in sight for the rest of the way up to the station. There are three sidings at each side of the railway at the south-east end of Navan station.

On the day of the collision there was a large cattle fair at Navan, and several special trains were run in consequence. The evidence is as follows :—

Evidence.

1. *James Sherry*, signalman and pointsman on duty at Navan station on the 11th October.—Came on duty at 4.30 a.m. About 6.30 p.m. a goods train arrived from Drogheda. I lowered the down distant-signal for the goods to enter the station. The wheel that works the signal is close to my cabin, which is at the south side of the line, about 150 yards from the east end of the station platform, and about 100 yards from the points which I was holding for the goods train to push back into the siding next my cabin at the south side of the station. The goods engine had been placed at the Drogheda end of the train to do this shunting. The goods train consisted of about 20 waggons at this time. It consisted of about 35 waggons when it arrived at Navan from Drogheda. As the goods train was pushing back at a speed of about three miles an hour the express passenger train, due to leave Drogheda at 6.10 p.m. and to arrive at Navan at 6.42 p.m., arrived and ran into the engine of the goods train. I think this occurred about 7.20 p.m. My down distant-signal was at danger against the express and the signal light was burning well. I have been about 14 years in company's service, 10 years pointsman and signalman at Navan. If the road is clear for passenger trains I always lower the distant-signal three or four minutes before the train is due. The gateman works the home-signal, which is west of the platform. When the road is blocked I keep my signal at danger till it is clear, and let the driver go on whistling. He pulls up then inside the distant-signal, but he did not do so on the 11th October. I generally have the road clear for the passenger trains. It is not the fact that I keep my down distant-signal at danger against passenger trains when the road is clear. We frequently move waggons at Navan by men pushing them. The rule of the station is to keep the signals on at danger till they are required to be lowered for passenger trains. I have a shunter to assist me in the shunting operations. There are three sidings at Navan at each side of the main line, which is a single line, and there is a great deal of goods and cattle shunting at Navan. The 11th October is one of the largest cattle fairs of the year at Navan, and the goods train that was run into was a special train.

2. *John Lowry*, engine-driver of the special goods from Drogheda on the 11th October.—I arrived at Navan with 33 waggons, a break-van, and a carriage about 6.15 p.m. My engine was a tender engine. I had a good deal of shunting at Navan, and about 7.7 p.m., when I was pushing back about 20 waggons into the siding at the south side of Navan station, my engine was run into by the engine of the express from Drogheda. I was moving at about two or three miles an hour at the time. I think about 10 of my waggons had passed through the points into the siding when the express engine struck my engine. Nothing in either train was knocked off the rails, but the buffers and buffer-plank of my engine were broken. No waggons were damaged. I have been a driver with

the company about 12 years. The express was running, I think, 12 or 15 miles an hour when it struck my engine. As soon as I saw the express was not going to pull up I gave my engine full steam to get out of the way. The down distant-signal was at danger against the express and the light was burning brightly. My fireman was with me on the engine. Sherry was holding the siding-points. I had a fixed white light on the right buffer of my engine and a red hand-lamp in my hand, which I was holding up to warn the driver of the express. I opened my whistle to attract his attention. He was about 50 or 60 yards inside the bridge at the time. The rule is to stop outside the bridge if the danger-signal is at danger. The signal is just inside the bridge. After stopping we pull in till we see the pointsman, if the road is clear, and then we act according to the signal he gives us with his flag by day and his lamp by night. I never found the distant-signal at danger when the road was clear, but when the signal is at danger I whistle as I approach it to call the signalman's attention. I and my fireman remained on the engine.

3. *Thomas Hamill*, engine-driver of express on the 11th October.—I left Drogheda 23 minutes late with the express due to leave Drogheda at 6.10 p.m. I had to wait for the arrival of a special train of cattle from Navan, as the railway from Drogheda to Navan is a single line. I arrived at the Navan down distant-signal about 7.8 p.m. My train was due at Navan at 6.45 p.m. The down distant-signal was at danger, it can be seen for a mile. I did not pull up because I expected the signal to be lowered when I sounded my whistle, which I did about a quarter of a mile before I reached the signal. This signal had been frequently at danger against me and had been lowered always when I whistled. I was not aware that there was a special on my road at Navan station, but I knew it was Navan fair day and I knew four specials had arrived at Drogheda. The speed was checked by my fireman putting on the tender break, but I cannot say exactly when, I had shut off steam about two miles from Navan. The incline falls for two miles south into Navan. I cannot say what the gradient is. I ran past the distant-signal at a speed of about four miles an hour. My fireman had jumped off as the train passed the distant-signal. I reversed the engine when I first saw the goods train in my road as I reached the distant-signal. I put steam against my engine as soon as I reversed. I whistled for the guards breaks about a full quarter of a mile before I reached the distant-signal, but I could not stop my train, and my engine struck the goods engine at a speed of about four miles an hour. I have been a driver with the company about 25 years. I had four coaches and a break-van on my train. There was a third-class behind the break-van, which was put on to accommodate the crowd in consequence of its being fair day. I did not stop when I saw the distant-signal at danger because I could not do so; as I was running too fast

expecting it to be lowered. I stopped on my engine. The buffer-plank was broken. I believe there was some damage done to the coaches.

4. *Edward Clark*, fireman of express on the 11th October.—As my train approached Navan I noticed the distant-signal at danger. I was about as far from it as Navan station office is from it. Steam was off and I had put my break tight on at this time. I cannot say what speed we were running, but we were not going fast. I cannot say that I had ever run faster than the train was going. I have been a fireman since June. I fell off the tender when I was squeezing the break hard, just before the collision. I slipped from missing my arm. My arm was a little scratched. I cannot say what speed we were going when I fell off. I think I could run as fast. I was as far as the waggon outside (pointing to waggon, which is about 70 yards away) when I fell off. I put on my break by signal from driver. I can see the distant-signal a mile from it.

5. *James Corry*, station-master at Navan, states: The down distant-signal is taken off a few minutes before trains are due if the road is clear. If the road is not clear it is kept up and drivers whistle and it is not lowered till the road is clear. I have frequently seen drivers pull up outside the signal and then pull inside. We have frequently trains that arrive from both sides at the same time, and then we stop both of

them. We should have collisions constantly if drivers did not pull up when the signals are at danger. It is not customary to telegraph all trains, but on that evening, as Navan was so blocked with the fair business, I asked Beaupark station to wire me when the express left Beaupark, and I received the telegraph from Beaupark about three minutes before the express reached Navan. The road was being cleared at the time. Hamill has been frequently stopped by signal. Hamill was quite sober.

6. *George Graves*, guard of express on the 11th October, states: My train consisted of engine and tender, three coaches, a van in which I rode, and a third-class at the tail of train; left Drogheda 6.35 p.m. When my train was a short distance outside the bridge which is close to Navan down distant-signal I heard my driver whistle for the breaks, and before I got my break hard on I was knocked down senseless and cut in the forehead by the collision. I saw the down distant-signal showing red when I was a mile from it. I think my train was going about four miles an hour when the driver whistled for the breaks. I have been a guard about 26 years. I never recollect my train being stopped by Navan down distant-signal. I have seen the signal on against my train, but it has always been lowered when the driver reached it in consequence of his whistling. I never recollect my train coming to a stop. I always work with the evening down express.

It appears that on the day in question, about 6.30 p.m., a special train of empty waggons arrived at Navan from Drogheda and the waggons were distributed as required in the various sidings which were pretty full at the time. The engine of this special train had been placed at the Drogheda end of the train, and was pushing back 20 waggons into the siding at the south side of the railway when it was run into by the engine of the express train from Dublin to Drogheda.

This occurred about 7.8 p.m. The passenger train was about 23 minutes late when it arrived outside Navan station. It had left Drogheda about 23 minutes late having been detained there in consequence of the late arrival of some of the special trains from Navan.

The passenger train consisted of an engine and tender, three passenger coaches, a break-van, in which the guard in charge was travelling, and a third-class carriage which had been attached behind the break-van in consequence of the extra traffic that was expected at Navan. It ran into the goods train at a speed variously estimated at 4 to 15 miles an hour. Judging by the effect, I think that the speed of the passenger train at the moment of the collision was probably about 8 to 10 miles an hour, and that the speed of the goods train, which was moving in the same direction as the passenger train, was about three miles an hour.

The points of the siding, into which the goods train was being shunted, are about 250 yards to the south-east of Navan station. They are worked by a pointsman who is stationed in a cabin 100 yards west of these points. This man also works the down distant-signal and several other pairs of points.

The collision occurred on the viaduct over the Boyne River, about 220 yards inside the distant-signal, which was at danger against the passenger train.

It was caused by the neglect of the engine-driver of the passenger train, who ran up to and passed the signal at such speed that he could not stop the train before his engine struck the goods engine. This man has been a very long time in the company's service and bears a very good character, but judging from his evidence, it would appear that his not having met with similar accidents before has been owing to the railway having been kept clear for his train rather than to his attention to the fixed signals.

I recommend that Navan station yard, which appears to be a busy place, should be re-arranged, that a second platform should be provided at the down side of the railway, and that the signals and points should be interlocked and worked from one or more cabins raised above the railway.

At present there are four unguarded sets of facing-points in the down direction, and two in the up direction.

It would also be desirable to work this single line of railway on the block principle in addition to the train staff.

*The Secretary,
(Railway Department),
Board of Trade.*

I have, &c.,
F. H. RICH,
Colonel R. E.

Printed copies of the above report were sent to the Company on the 20th November 1878.

GREAT NORTH OF SCOTLAND RAILWAY.

SIR, Railway Department, Board of Trade,
13, Downing Street, London, S.W., 31st October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the order of the 24th ultimo, the result of my inquiry into the accident which occurred on the 13th ultimo at Nethy Bridge station, on the Great North of Scotland Railway.

In this case, as the 3 p.m. mixed passenger and goods train, consisting of engine and tender, 12 waggons, a composite carriage, and a break-van, from Craigellachie junction for Boat of Garten, was standing at Nethy Bridge station, the boiler of the engine exploded.

No passengers were injured.

An engine cleaner on the foot-plate of the engine received a wound in the skull, from the effects of which he was laid up for about three weeks; the driver, fireman, and breaksman (who was also on the foot-plate) escaped without any serious injury. The front plates of the barrel of the boiler were blown away about 200 yards from the engine, the middle plates torn across, and the framing and motions of the engine damaged to the extent shown in the Appendix.

Description.

The engine, the boiler of which exploded on the present occasion, was built by Messrs. Stephenson and Co., of Newcastle, and commenced running in May 1863. It is an eight-wheeled engine with a leading four-wheeled bogie, and coupled driving and trailing wheels, and a four-wheeled tender. The cylinders are outside, measuring 16 inches by 22 inches. The barrel of the boiler is 10 feet 10 inches long, and 3 feet 9 inches in diameter, and is formed with six plates, three in the length and two in the circumference of the boiler; the longitudinal seams overlap $3\frac{1}{2}$ inches, and are double rivetted, the vertical seams $2\frac{1}{2}$ inches, and single rivetted. The longitudinal seams of the middle plates are at the centre of the barrel, those of the end plates at the top and bottom. The original thickness of the plates was $\frac{7}{16}$ of an inch; the dome is over the top of the fire-box. On the top of it there are two safety valves with Salter's balances, ferruled to a maximum pressure of 140 lbs. to the square inch.

The boiler was re-tubed in April 1871, having been then thoroughly examined and no signs of grooving detected. Up to this period (eight years) the engine had run 222,615 engine miles, and from April 1871 to September 1878 ($7\frac{1}{2}$ years) 129,197 engine miles; total 351,812 engine miles.

The engine was thoroughly repaired in August 1877, when the boiler was tested with a cold water pressure of 170 lbs., and afterwards with a steam pressure of 160 lbs. to the square inch, without any signs of weakness having been detected. The safety valves were then adjusted to blow off at 140 lbs. pressure.

Evidence.

1. *Archibald Leslie*, driver $2\frac{1}{2}$ years.—I commenced work on the 13th September with engine No. 31 at the Boat of Garten station, and started at 6.30 a.m. for Keith. I returned from Keith at 12.40 to Craigellachie junction, and left the latter at 3 p.m. for Boat of Garten. I stopped at Grantown, and left it at 5.47 right time (having next to stop at Nethy Bridge), with a load of 14 vehicles, consisting of 12 waggons next the engine, a composite carriage, and a break-van. I was running engine first. We reached Nethy Bridge at 6.3 p.m., and remained there

about three minutes. During this time I oiled the cylinders and slide valves of the engine; this I did from the foot-plate, but neither I nor the fireman were underneath. While standing at Nethy Bridge the indicator showed only 105 lbs. of pressure; the safety valves are ferruled to 140 lbs. pressure, but the engine would blow off very strong at 120 lbs., and if the indicator showed 125 lbs. we could hardly hear ourselves speak. On this occasion it was not blowing off at all. There were about 6 inches of water in the gauge glass; the injector had just been shut off.

Before starting from Nethy Bridge there was on the foot-plate the fireman, breaksman, and a cleaner, the latter returning to Boat of Garten. Just about the time for starting I was looking back over the left-hand side of the engine for a signal to start, and while doing so I heard a rush of steam, from where coming I could not distinguish, and on the steam immediately clearing away I missed the fireman and breaksman; the former had been standing on the right-hand side and the breaksman in front of me; the cleaner was sitting on the right-hand seat. I leaped down on the left side, but saw nothing of either of the men, but on going round to the right-hand side found the fireman coming towards me, not much hurt, but he told me he was afraid the cleaner was killed. On hearing this I jumped up on the right side and found the cleaner still sitting on the seat, but insensible, with his head cut. The breaksman and guard then came up and helped to remove the cleaner. The reversing lever was lying in full forward gear. I did not see the plate fly away; it was afterwards picked up on the right-hand side and nearly at right angles to the line, 206 yards off. It had struck the ground about six paces from where it was picked up; it missed the station buildings. The engine moved very slightly when the explosion took place; no wheels were thrown off the rails. I have had charge of the engine for five months, and during this period had never observed any signs of leakage in the boiler, either of steam or water. The explosion took place

on Friday, and the two safety valves had been last looked at the previous Saturday, when I had seen the fireman unscrew the Salter balances, and observed that they were freely acting; and I had slacked them again on the previous Wednesday and found them then in good order. Something struck me on the right side, but I was not injured.

2. *Alexander McDonald*, fireman three years, about 2½ years with Leslie.—I have worked with engine No. 31 about five months. The explosion knocked me back on the coal; something having struck me. I at once jumped off from the back of the tender. I was not much hurt. I did not know at the time what had happened to the cleaner. I did not see the plate go away. I agree with the rest of the driver's evidence.

3. *George Stuart*, engine-cleaner since July.—I joined engine No. 31 at Nethy Bridge (where I lodged) to go to my work at Boat of Garten. I had been on the engine about a minute, sitting on the right-hand seat, when the boiler exploded. The steam was shut off at the time, and no steam was blowing off at the safety valves. I had not noticed the indicator. I neither felt nor heard anything, having been knocked senseless. I came to myself the following morning. I received a wound in the skull, and was laid up for about three weeks. I have now quite recovered.

Conclusion.

From a careful inspection of the exploded boiler and a consideration of the foregoing evidence, it appears that while engine No. 31 was standing at Nethy Bridge station, with the pressure gauge showing 105 lbs. of pressure (not sufficient to cause steam to blow off at the safety valves), and without any application of steam, the barrel of the boiler suddenly exploded, the two front plates adjoining the smoke-box having given way along the bottom seam, being torn from the angle iron connecting them with the smoke-box and from the middle plates, and then projected in one piece to a distance of 206 yards, nearly at right angles to the line. The middle plates were also torn as marked on the accompanying drawing. The tubes were very little injured. There is very little reason to doubt but that the explosion commenced along the bottom seam of the two front plates next the fire-box, grooving being very evident along the course of this seam in the left plate, which passed at the bottom outside the right plate. The grooving was deepest near the centre of the seam, having here and there but a very slight thickness of sound metal; otherwise the plates were in good order, had diminished but little in thickness, and were not much pitted.

The practice of making locomotive boilers with horizontal seams below the water line is now almost abandoned, on account of the liability of these seams to become grooved without the possibility of detection, except when the boiler has to be re-tubed or a leakage occurs. The locomotive superintendent of this railway informs me that he is most anxious to substitute new boilers of improved construction in place of those of similar construction to the one recently exploded, and I trust he will be able to carry out his intention with the least possible loss of time. Meantime it would, I think, be only prudent to reduce the pressure at which these engines are now working, or else to subject them to a severer test than that to which the boiler in question had been submitted in August 1877. With a cold water test of only 170 lbs., this boiler had been permitted to work up to 140 lbs. With boilers of similar age it is more customary to press them up to 200 lbs. and work them at 120 lbs.

The Secretary,
(Railway Department),
Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

APPENDIX.

DAMAGE done to No. 31 ENGINE from the EXPLOSION of the BOILER at NETHY BRIDGE STATION, on 13th September 1878.

Engine Framing.—Both main frame plates bent between driving wheel and cylinders. Left-hand outside frame plate damaged. The frame has had to be taken entirely separate to get main frame plates straightened.

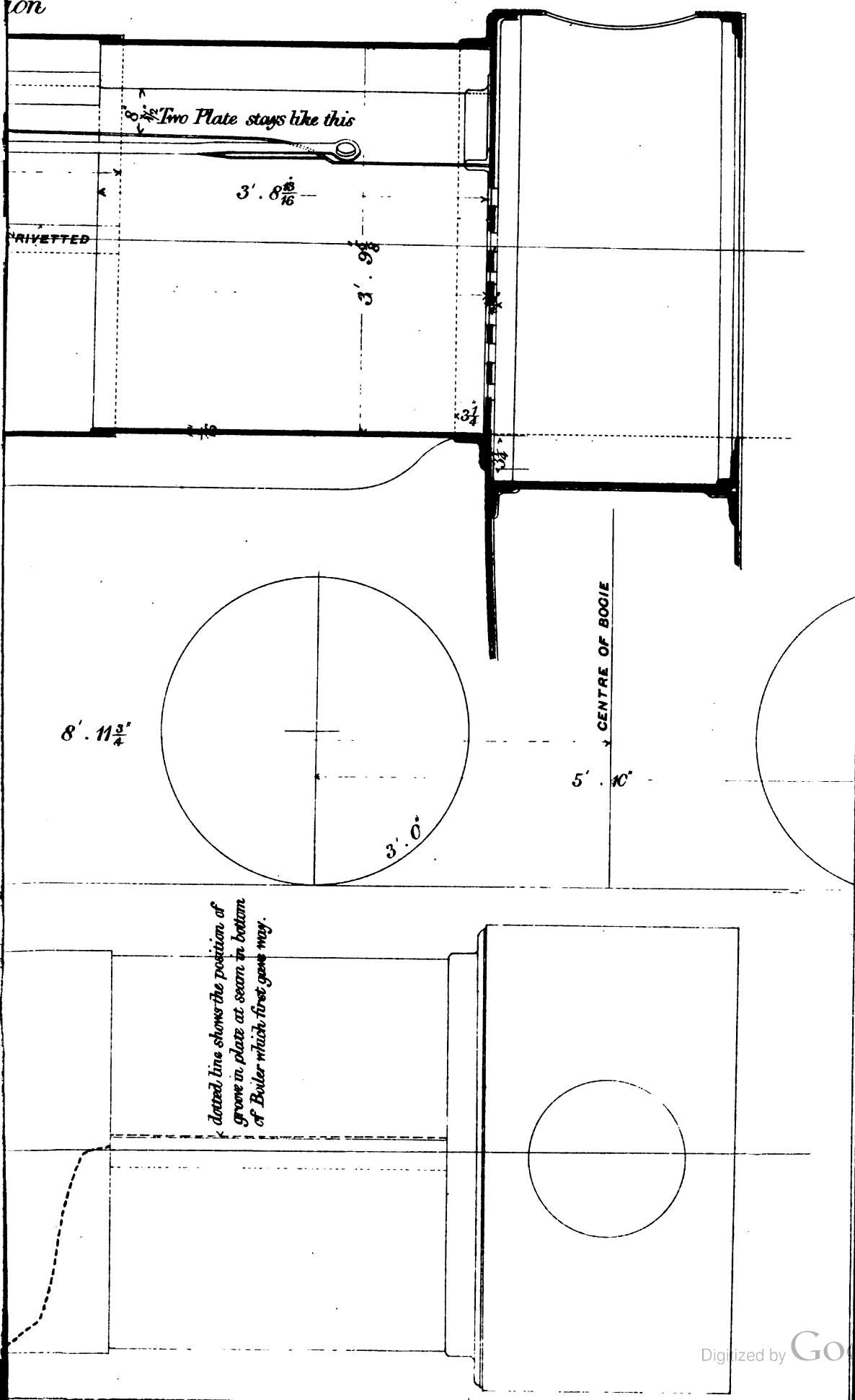
To accompany Major General Hutchinson's
Report dated 31st October 1878.

SCOTLAND RAILWAY.

№ 31 ENGINE.

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Wheels and Axles.—Driving axle bent in left journal; required to be renewed. The axle was cast steel. Frame of left driving wheel slightly twisted.

Gearing.—Weight on shaft and reversing rod much damaged, will repair. Two suspension links destroyed. Left-hand connecting rod slightly bent.

Boiler and Tubes.—Barrel of boiler and tubes destroyed. Note:—The entire boiler, fire-box, and tubes have been broken up.

Boiler Mounting, &c.—The entire lagging destroyed. Brass dome cover damaged. Hand rails and brackets, blower cock, top clack boxes and feed pipes, sand-box rods, levers, and valves, and weather board glasses destroyed; both whistles damaged. Copper top of chimney destroyed.

Splashers and Sand-boxes, &c.—Both driving wheel splashers and sand-boxes destroyed. Foot-plate along each side of engine destroyed.

No damage of any kind done to tender.

WILLIAM COWAN, Local Superintendent.

Printed copies of the above report were sent to the Company on the 10th February.

GREAT WESTERN RAILWAY.

Board of Trade (Railway Department),

SIR, 13, Downing Street, London, S.W., 16th October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 9th instant, the result of my inquiry into the causes of an accident which occurred on the 6th instant to a passenger train near Bradford junction, on the Great Western Railway.

In this case, soon after the 1.27 p.m. down passenger train from Trowbridge to Bradford had run from the main line to the branch, the engine left the rails and ran for about 132 yards before coming to a stand.

Three passengers have complained of being injured.

On the engine the sand pipes, one guard iron, one break-rod, one trailing buffer casting, two cylinder cocks, and one hanging link of coupling were broken, and the top plate of one driving wheel spring was also slightly cracked. In the train one buffer rod was bent.

The permanent way was a good deal cut up for about 60 yards, principally on the right-hand side. The following new material has been used to replace what was damaged:—15 transoms, 174 feet of longitudinal timbers, 180 feet of rails, 140 fang bolts, and 30 strap bolts.

Description.

About 1½ miles north of Trowbridge station, on the Wilts, Somerset, and Weymouth section of the Great Western Railway, the branch line from Trowbridge to Bradford and Bathampton leaves the main line, on a 20-chain curve to the west, the facing points being on the up main line.

The junction, which is known as Bradford junction, is provided with the usual signals worked from a raised signal box.

The main line is a double line, and the branch also is double as far as Bradford station.

The permanent way consists of an 80-lb. iron bridge rail, laid in lengths of 18' 4", on longitudinal sleepers of creosoted pine, 20 ft. to 25 ft. long, and 14" × 7", to which they are secured by fang bolts, 18 to each rail.

There are, at 11 feet intervals, transoms 7" × 5" between the longitudinal timbers, to which they are secured by iron straps and bolts.

The branch line was opened for passenger traffic as a single line in January 1857, and it has since been doubled as far as Bradford.

The original line, upon which this accident occurred, has not been relaid since the date of its opening.

Trains going from Trowbridge to Bradford pass along the up main line as far as the junction, but, on the branch, the line to Bradford is called the down line, and the trains are down trains.

The branch line from the junction up to the point where the accident occurred is level.

Evidence.

Thomas Barrow, signalman 20 years, states:—I for eight hours. At 1.42 p.m. I got "train on line" am signalman in charge of Bradford junction signal from Trowbridge No. 2 box for the 1.27 p.m. down box. On the 6th of October I came on duty at 7 a.m. passenger train to Bradford. The train passed my

box at 1.46 p.m. It is timed to pass at 1.32 p.m. The regulation speed for going over the junction is 15 miles an hour. It was certainly not going so much as that, not more than 10 miles an hour, I should think. The first thing I knew of anything being wrong was from hearing the break whistle. I looked out and saw the engine jumping about, apparently off the rails, about 200 yards off. The line was clear as far as I could see when it passed me.

Alfred Harris, driver 18 years, 11 years of which passenger driver, states:—On the 6th of October I was driver of the 1.27 p.m. passenger train from Trowbridge to Bristol, consisting of tank engine, four coaches, one break-van, and a covered carriage truck. My engine is a 6-wheeled tank engine, with driving and trailing wheels coupled, and with one break block on each of the four coupled wheels. We were running chimney first. We left Trowbridge at 1.40 p.m., 13 minutes late. I had come from Reading with the train, and lost time at Trowbridge in getting round the train. The signals were right all the way, and I passed the facing points at Bradford junction all right, at a speed of certainly not over 12 miles an hour. I know there is a rule that 15 miles an hour is not to be exceeded at this point. About 150 yards farther on I felt the front end of the engine lift and then drop down. I looked over at once and saw that the leading wheels were off the rails to the right. My steam was off at the time, as I do not put it on after passing the junction until I am off the curve. My fireman put the break on, and I sounded the whistle for the guard's break. I don't think the other wheels got off for some distance. The engine was oscillating a good deal, and I could not feel exactly where they ran off. We pulled up in about 150 yards. The off leading wheel was in the 6-foot, over near the off rail of the up road. The engine was slewed round a little. None of the other vehicles were off the rails. On the engine the guard iron and sand pipes, and links of front coupling were broken. The engine had been running smoothly and well up to the time of the accident. I got off and examined the line, and found a mark where the right leading wheel had first run over the outside. Close by there was a round mark on the top of the rail, as if something had been on it. There were marks of the flange of the right wheel running along the outer flange of the rail, over the tops of the fang bolts, and a parallel mark on the other side inside the left rail. I have been driving for more than four years over this road, and have always felt it to be even and smooth to run over.

Isaac Baker, fireman 6½ years, was fireman to Alfred Harris, and has nothing to add to his evidence.

Edward Morris, passenger guard 12 years, states:—On the 6th of October I was guard of the 1.27 p.m. down train from Trowbridge, made up as follows:—Tank engine, two third-class and two composite carriages, guard's van, and covered carriage truck. We left Trowbridge at 1.40 p.m., 13 minutes late. We ran, I should say, rather under our usual speed up to and past Bradford junction. When my van was about 100 yards past the junction I heard the break whistle, but before I could apply it I was thrown right across the van; and when I had got up again the train had stopped. I felt no shock whatever before hearing the break whistle, and the shock must have been when the driving wheels got off. I got out, and finding that the engine was off the rails I went back to Trow-

bridge for assistance. The fireman went out to protect the up road, and I warned the signalman at Bradford junction to block both roads. None of the vehicles in the train were off the rails, and the only damage to them was the bending of a buffer rod of a third-class carriage. No passenger complained of injury at the time. I didn't examine the road, but the running had been quite smooth up to the time of the accident. The driver is a very steady man, and was perfectly sober. It was exactly 1.45 p.m. by my watch when the train was stopped. There is no ground whatever for saying that the speed was too high. It was certainly, if anything, under the usual speed. I didn't go to the passengers, who had all got out of their carriages, because I could see that there was little or no damage done, and I hurried back to protect the train, and to get assistance. The train was pretty full.

Henry Gerrard, booking clerk at Trowbridge, states:—On the 6th of October, when the guard of the 1.47 p.m. down train came back, and reported that there had been an accident, I went out to give assistance if required. When there I was looking at the marks on the rails where the engine first ran off, and I saw a hexagonal mark on the crown of the rail, a little nearer to the junction than the first mark outside the rail. I looked about and found an iron nut lying in the 4-foot, a few inches from the right rail, and some few yards nearer to the engine than the mark was. The size and shape of the nut corresponded exactly with the impression on the rail, and the nut itself had evidently been subjected to a very heavy pressure.

Abraham Ivens, inspector of permanent way, states:—I am in charge of the section from Trowbridge to Bath. I was over the spot where the accident occurred on the previous Wednesday. I examined the junction and the road, trying the gauge in several places, and everything was in good order. I was on the spot about four hours after the accident, and made a thorough examination of the road. The first mark of any kind was on the right rail of the down road, about 150 yards from the junction. Here there were marks of the flange of an engine wheel running along the outer flange of the right-hand rail, but I could see no marks of the flange running over the rail. It seemed as though it had jumped over. These marks continued for about 50 yards, with a mark of the left wheel running over the transoms. About 70 yards further on, the right rail and right longitudinal were a good deal knocked about, and this continued for about 60 yards. This is the only portion of the road to which anything has been done since the accident, and here 15 new transoms, 174 feet new longitudinals, 180 feet of new rail, 140 new fang bolts, and 30 new strap bolts have been used. I could find nothing to account for the engine leaving the rails, and can only think it must have been caused by the nut being placed on the rail.

Jesse Sainsbury, ganger of packers, states:—I was at the scene of the accident and examined the road at about 3.30 p.m. Everything was right up to the first mark, the gauge correct, about ¼" slack, and the cant even. I saw the print of the nut on the rail just before the mark where the off wheel dropped outside the rail. The line had been walked that morning. There are often people on the line on Sundays. It is impossible to keep them off.

Conclusion.

From the foregoing evidence, and from the results of an examination of the line at this point, it appears that the leading wheels of the engine of the 1.27 p.m. down train from Trowbridge to Bradford left the rails towards the right or the outside of the curve of the branch down line, about 150 yards after passing the junction, that

it ran with these wheels only off the rails, and on the longitudinal sleepers, for a distance of about 70 yards, when the other wheels of the engine also ran off, and that it finally came to a stand, with all the wheels off the rails, about 132 yards from the point where the leading wheels first left the rails.

At the time when I made my inspection of the scene of the accident the first mark to be seen was on the outer flange of the right rail; there was no mark whatever of the flange of the right wheel running over the top of the rail, and none of the witnesses had observed any such mark, but two of them speak to a mark on the top of the rail, a little nearer to the junction than the mark on the outer flange, corresponding exactly in size and shape to a hexagonal $\frac{3}{8}$ -inch nut, which was picked up close by.

This nut, which was produced, was about $\frac{3}{4}$ inch in thickness, and showed evident signs of having been subjected to a heavy crushing weight.

The road up to this point had, to all appearances, not been touched since the accident, and it was in good order. The gauge was regular, and, as it should be on a curve, a little slack; the cant was also regular, and calculated for a considerably higher rate of speed than is ever used on this curve. The timber of the longitudinals, which had been taken out further along the line where the driving wheels had run off and damaged them, was perfectly sound, remarkably so indeed, considering the length of time it had been in the ground. The rails, though worn and rough on the outer face, were smooth and even on both the top and the working face.

The engine is a tank engine, weighing 34 tons 8 cwt., of which 9 tons are on the leading wheels, 13 tons 10 cwt. on the driving wheels, and 11 tons 18 cwt. on the trailing wheels. The driving and trailing wheels are coupled, and are 5 ft. in diameter, the leading wheels being 3 ft. 6 in. in diameter.

The wheel-base is 16 ft.,—7 ft. 9 in. from leading to driving wheels, and 8 ft. 3 in. from driving to trailing wheels. The engine had run, up to 30th June 1878, 84,140 miles, and had recently been thoroughly repaired, the wheels being turned up. It has run since leaving the shops, on 3rd April 1878, 9,579 miles.

The wheels gauge correctly and the flanges are not worn, and the only injury to the springs was a slight crack in the top plate of the left driving spring, which was apparently the result of the accident.

The speed of the train on passing over the junction was, according to the evidence, from 10 to 12 miles an hour, and, as it had taken five minutes to run the $1\frac{1}{4}$ miles from Trowbridge, there is no reason to think that this speed was exceeded, steam having been shut off before passing the junction, and being still off at the time of the accident.

It therefore appears that this accident cannot be attributed either to the defective state of the road or of the engine, or to an excessive speed, and therefore, although it is difficult to believe that so slight an obstacle would be a sufficient cause, I can only account for it by supposing that, in passing over the $\frac{3}{8}$ -inch nut, which there is no doubt was on the rail, and which was too small to be swept off by the guard iron, or to be seen from the signal box, the leading end of the engine must have lifted sufficiently for the flange of the right leading wheel to be above the top of the rail, and that it therefore followed its natural tendency to fly off on the outside of the curve.

There is no evidence to show how this nut came to be on the rail, but it can hardly have been in this position unless it had been purposely placed there, quite possibly from pure mischief, and without any malicious intent.

As, however, such practices are most dangerous, and it is very difficult to keep people off the line, it is to be hoped that all persons detected in trespassing will be rigorously prosecuted.

The Secretary,
Railway Department, Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on the 2nd November 1878.

GREAT WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., 31st October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 16th instant, the result of my inquiry into the causes of a collision which occurred at Dudley station, on the Great Western Railway, on the 11th instant.

In this case, as the 9.50 p.m. up passenger train from Wolverhampton to Kidderminster, consisting of tank-engine, one third-class carriage with break compartment, three composite carriages, and one third-class with break compartment at the rear of the train, was running into Dudley station, where it was timed to stop at 10.13 p.m., it came into collision with an empty down train, consisting of tank-engine and five carriages, which was standing on the up line, near to the up end of the platform, at 10.16 p.m.

Five passengers are returned as having been slightly shaken, but ten in all have since the accident complained of injury.

On the engine of the up train the buffer plank, two buffer castings, and left-hand stuffing box were broken, and left-hand spindle was bent.

On the engine of the empty train the buffer plank, and red shade to lamp, were broken.

There was no damage to the carriages in either train, or to the permanent way.

Description.

Dudley station, on the Oxford, Worcester, and Wolverhampton section of the Great Western Railway, is approached on the up line from the north, on a curve to the west of about 20 chains radius, and on the level.

It has an island platform 240 yards in length, and there are two signal-boxes. The north box is situated 246 yards north of the north end of the platform, and the south box, which works a junction with the London and North-Western Railway, is on the platform, near to the south end of it, the distance between the two boxes being 470 yards.

There is a cross-over road, with disc signal, worked from the north box, the points on the up line being 40 yards north of the north end of the platform.

The station is protected on the up line by up distant, up home, and up platform stop signals, which are worked from the north box. The two latter are situated respectively 380 yards and 120 yards north of the platform.

The point of collision was nearly opposite to the north end of the platform, and about 250 yards from the north box.

The terminal station of the London and North-Western Railway Company's branch line to Dudley is at the east side of the Great Western Railway station, the lines running parallel and quite close to each other.

The line is worked on the block system with Tyer's instruments, and bell and gong code of signals.

Under the rules in force "line clear" can be returned on the up line at Dudley station when a train is within the home-signal, and before the station is clear.

Evidence.

John Cook, signalman six years, the whole of which at Dudley, states:—I came on duty in the North box, Dudley, at 6.10 p.m. on the 11th instant, for a ten hour shift. At 10.10 p.m. a train of empty coaches was standing on the down line, waiting to cross over on to the up line, and get back to the junction and away to Birmingham. The usual course is for this train to wait until the 9.50 p.m. up train from Wolverhampton has passed. On the night in question there was a down goods train waiting on the down line behind the train of empty carriages. I therefore shunted the empty train across through No. 11 cross-over road on to the up road, to let the goods train get away. I didn't give the driver any special instructions, beyond that he was to go across on to the up line. This was at 10.10 p.m. I gave two beats of

the gong to the south cabin before I pulled the points over, and received two beats in reply. Almost at the same time, at 10.10 p.m., I got two beats and train on line from Tipton junction for the 9.50 p.m. up passenger train, and I acknowledged it. Line clear had been given some time before by me. At 10.13 p.m., I gave seven beats to the south box to let him know that I wanted line clear for this train, and I got back four beats and line clear at 10.14 p.m. I answered it, and then took off my signals for the up train. The signal of seven beats was not returned from the south box. It is the order that all signals are to be returned, and are to be repeated until they are returned. When I took my signals off I did not know where the train of empties was standing. The up train passed at 10.16 p.m., and ran into the engine of the empty train

about the end of the platform. I can't say whether this engine had a head light on or not. The spot where it was standing was full in view of my box in the daytime, but at night there are so many lights about that I couldn't tell what was standing there. I may have put this empty train across before the up train had passed three times in the last six months, and each time it has gone away to the south end of the yard without my giving any special instructions. I can't say for certain how often this has happened, nor can I say that it was the same driver on the occasions when it did happen. The passenger train was due to pass at 10.13 p.m., and actually passed at 10.16 p.m., going at about 10 miles an hour, its usual speed. I didn't hear the driver sound his whistle until after he had passed my box. I have never put the train of empty carriages across on the up line, and then brought it back on to the down line, to wait for the up train to pass. If the engine of the empty train had had a red head light on I could have seen it where it was standing.

Samuel Horne, signalman 20 years, 15 years of which at Dudley, states:—On the 11th inst., I came on duty at 10 p.m. for an eight hours shift. The first signal I received from the north box was at 10.15 p.m. I then got two beats signifying up passenger train. I acknowledged it by two beats. This signal turned out to be for the 9.50 p.m. up train, which eventually passed my box at 10.38 p.m., after being in collision. I am quite certain I did not receive two beats at 10.10 p.m., or answer such a signal, nor did I give back four beats, nor did I receive seven beats.

Edward Hemming, passenger driver eight months, states:—On the 11th inst., I drove the 9.20 p.m. down train from Birmingham to Dudley, consisting of tank engine and five coaches, two of which were third class with break-compartments. I arrived at Dudley at 10.1 p.m., one minute late, at the down platform. After the train was emptied I was instructed by the porter in charge of the platform to draw down to the cross-over road, in order to get across, and set back to the junction to go to Birmingham as usual. This was a few minutes after 10. I went forward and stood for four or five minutes a little south of the north box. There was at that time a goods train standing behind me on the down line, waiting. I knew that the up train had not passed. The signalman in the north box shouted to me "I want you to set back over the points on to the up road to let the goods pass," or words to that effect. He gave me a hand-signal with lamps, and I set back as soon as the disc showed that the points were right. I expected that as soon as the goods had got away I would be brought back on to the down line, until the up train had passed, and therefore I waited just over the points. I got off the engine to put a drop of oil on one side, and on getting on again I saw that the arm of the platform up stop signal was off. I could not see the back light. I then almost immediately saw the head light of the engine of the up train coming, not more than 50 yards off. I put on steam to get back as quick as I could, and had moved 8 or 10 yards before the collision occurred. I remained on my engine. I sounded my whistle as soon as I saw the other engine, and the other driver whistled at almost exactly the same time. I could not see if his breaks were on. The shock was not much, I hardly felt it, and it didn't knock me or my mate over. I had my two head lights on as usual, and when I came to a stand, after being put across, I reversed the lower

lamp, so as to show a red light. I am certain it was showing a red light all right. It was rather an over-cast night, but I think the light must have been visible from the signal-box. The only damage to my engine was the breaking of the buffer plank, and the red shade of the lamp. I can't say how fast the other train was running. There was no damage to the other vehicles in my train. I have often driven this same train before, but I have never before been put across until after the up train had passed.

Charles Edkins, fireman seven years, states:—I have nothing to add to the driver's evidence. I didn't see the up train till after he did. It was then about opposite to the up stop signal-post.

Robert James Taylor, passenger driver seven months, states:—On the 11th instant I was driver of the 9.50 p.m. up passenger-train from Wolverhampton to Kidderminster, consisting of tank engine, running engine first, and five coaches, two of which were third-class with break compartments. My engine is a six-wheeled engine, with driving and leading wheels coupled, with break blocks on each. I left Tipton a little late, and the signals were right all the way. The signals at the north box Dudley were right for running into the station, where I am timed to stop at 10.13 p.m. I thought all was clear until I got opposite to the up platform stop signal-post, when I saw a red light on the line ahead of me. I opened the big whistle for the guard's breaks, and reversed my engine at once, getting steam against her, and my mate applied the breaks. I must have been running about eight miles an hour, as I was coming with steam off, ready to stop at the platform. I had shut steam off before passing the north box. I had not reduced to less than six miles an hour when I struck the engine of a train of empties, which was on the up line. This engine was moving slowly back at the time that I struck it. The shock was very slight, and I was not knocked down. On my engine the buffer plank, two buffer castings, and left-hand stuffing box were broken, and left-hand spindle was bent. The other engine was chimney first. The lower head light was showing red, and I could see it plainly. It was a thick night, but I could have seen the red light further than I did, had it been in a clear open position. As it was there were so many lights about on the North-Western line, as well as on our own line, that it was difficult to distinguish them. There were no other red lights about on our road, but there was a goods train on the down road.

Thomas Wellings, fireman six years.—Was fireman to the above and has nothing to add.

George Hunt, passenger guard eight years, states:—On the 11th instant I was guard of the 9.50 p.m. up train from Wolverhampton. I was riding in the rear break compartment. We left Tipton at 10.12 p.m., two minutes late, and were running into Dudley station at 10.15 p.m., two minutes late, at the usual speed—six to eight miles an hour. I heard the whistle for the breaks, but can't say exactly where we were at the time. I had just time to get to my break handle when I felt a shock, which knocked me over. On getting out, I found we had run into a train of empty carriages which had been standing at the platform. There was no damage to the carriages in my train, and no vehicles off the rails. One or two passengers complained of being shaken at the time. My driver was quite sober.

Conclusion.

From the foregoing evidence it appears that the 9.20 p.m. down passenger train from Birmingham, having discharged its passengers at the down platform at Dudley, was, in order to clear the down line for a goods train, sent by the signalman at the north signal-box across on to the up line, without waiting as usual for the passing of the 9.50 p.m. up train from Wolverhampton, and that it was standing on the up line,

just over the cross-over road points, when the up train came up and ran into it before it was able to move more than a few yards out of the way.

The signalman in the north box states that he signalled the empty train on to the south box, that his signals were acknowledged in the proper manner, and that he had no doubt that it had proceeded to the other end of the station to get away to Birmingham. The signalman at the south box denies that he received any signals whatever with regard to this train, while the driver states that he waited where he did, in the expectation that as soon as the down goods train had got away he would be brought back on to the down line again.

The entries in the books of the two signalmen support their respective statements.

It is impossible that both these men can be speaking the truth, for the south box signalman can hardly have omitted to hear the number of signals stated to have been sent, and certainly cannot have answered them without knowing that he had done so. There is little or no collateral evidence to support the statements of one or other of them, but I have no doubt in my own mind that the man to blame for this collision is the signalman in the north box, who probably sent the train of empty carriages across with the intention of bringing it back again on to the down line, and then having forgotten all about it, endeavoured to throw the blame on the signalman in the south box, by making false entries in his book.

Even if his statement were true, he ought to have seen the red head light on the engine, which was under 250 yards from him, if he had looked to see if the line was clear before taking off his signals for the up train.

The driver of the up train might have seen the red light sooner if he had been keeping a proper look-out, but it must be remembered in his favour that he was running with all signals off for him to enter a station, and that, owing to the curve of the line, and the position of the two stations alongside each other, it was not easy at once to see on which line the red light was standing.

I have, &c.,

F. A. MARINDIN,
Major, R.E.

The Secretary,
(Railway Department,)
Board of Trade.

Printed copies of the above report were sent to the Company on the 22nd November 1878.

GREAT WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., 6th December 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in your Minute of the 15th November, the result of my inquiry into the causes of a collision which occurred on the 11th of November at Molland and Bishops Nympton station, on the Devon and Somerset Branch of the Great Western Railway.

In this case the 8.40 p.m. down passenger train from Taunton, consisting of tank engine, composite carriage with break compartment, ordinary composite carriage, and third-class carriage with break compartment, entered the passing loop at Molland and Bishops Nympton station at too high a rate of speed, and, running through the station, came into collision, at about 10 p.m., with the 9.20 p.m. up mixed train from Barnstaple, consisting of tender engine, two trucks, break-van, and one passenger carriage, which was on the single line beyond the loop points, drawing slowly up to the up home-signal, which was at danger.

There were only three passengers in each train, and of these one was injured.

The following is the damage to the rolling stock :

In the down train. Leading buffer-beam, buffers, life-guard, and leading end of frame of engine broken, two buffers on third-class and composite carriage broken.

In the up train. Leading buffer-beam, both cylinder covers, right-hand cylinder, leading end of frame, buffers, life-guard, bogie frame, and leading axle-boxes of engine broken, one buffer-rod broken and one bent on break-van.

None of the vehicles were thrown off the rails.

One rail and three sleepers were damaged, and have been replaced.

Description.

Molland and Bishops Nympton station is a passing place on the Devon and Somerset single line, about $14\frac{1}{2}$ miles east of Barnstaple.

The line was opened in 1873, but the passing loop at this station was opened in 1876.

The loop is 300 yards in length, and the station is provided with distant, home, and starting signals, in both directions, the home-signals being about 30 yards outside the loop points at either end, while the down distant is 600 yards, and the up distant is 292 yards, outside the home-signals. The gradient through the station is 1 in 320, but the line falls from East Anstey, at the summit level of the line, to Molland throughout the whole distance of $4\frac{3}{4}$ miles, the steepest gradient being one of 1 in 58.50. From the down distant-signal to the down home-signal the gradient is 1 in 107.

The line continues to fall beyond the station, the gradient between the up home and up distant signal being 1 in 155.

The actual point of collision was 70 yards outside the down end of the loop.

The points and signals are correctly interlocked.

The engine of the down train was a four-wheel coupled bogie tank-engine, weighing 39 tons, with hand-break, having one wooden block on each of the coupled wheels.

Evidence.

Henry Frost, driver 16 years, states: I was driver of the 8.40 p.m. down train from Taunton on the 11th November. I left East Anstey about right time, and arrived at Bishops Nympton and Molland at 10.1 p.m. Instead of stopping at the platform I ran past and came into collision with the up train which was on the other side of the up home-signal, and which was moving slowly at the time. When I came into collision with the up train, I was going about five miles an hour. I noticed that the up home-signal stood at danger. The down signals were standing "all right" as I passed. It was thick snow and sleet all the way from Wiveliscombe, and I had difficulty in pulling up at the various stations. My mate put on the break just after I left East Anstey, five miles distant, and it was kept on tight all the way, and I blew the guard's whistle nearly a mile from the station, on the incline, but I felt no effect from the guard's break. I tried to sand the metals, but the bottom of the pipes was choked with snow. I reversed my engine at the home-signal without producing any effect, as the wheels skidded. It is a steep falling gradient all the way from East Anstey to Bishops Nympton. I have been on the line 25 years, and driver for 16, and have driven on the Devon and Somerset for 5 years, or ever since the opening in November 1873. I have never been fined or reprimanded during the time I have been in the Company's employ. My engine is a four-wheel coupled bogie tank-engine, weighing 39 tons, and is fitted with a hand-break, having the wooden break block on each coupled wheel. The break was in good order. I have never overrun this station before. I did not ease my break when I found the wheels were skidded. I noticed that the train was getting the better of me before getting to the down distant-signal, and I immediately blew my whistle for the guard's breaks. The signals were right, and the lights burning well.

T. Tucker, fireman six years, states: I was fireman to Henry Frost on the 11th November. After leaving East Anstey, steam was shut off just before coming to the up distant-signal that is about 300 yards from East Anstey. The break was as usual applied soon after passing that signal, and it was eased and tightened from time to time down the bank. I put it on as tight as I could about a mile and a half from Molland, and did not ease it afterwards.

William Pope, guard 5 years, states: I was guard in charge of the 8.40 p.m. passenger train from

Taunton on the 11th of November. I left East Anstey at 9.50 p.m., right time. On nearing the distant-signal at Bishops Nympton and Molland station, I was letting down the window, and heard the break-whistle sounded. I applied my break, and directly afterwards I heard the whistle sounded a second time. I applied extra power, and the wheels skidded, but the break did not appear to lessen the speed. The train ran through the station at about the rate of 8 or 9 miles an hour, and came into collision with the engine of the 9.20 p.m. up train, just beyond the up home-signal. I looked through the train and found I had three passengers, one second class and two thirds. I asked if they were all right; two said they were not hurt, but the third, who was in a third-class carriage, complained that he had received a blow in the side. I asked if they would like to walk to the station. They at once alighted, and then I informed them that there was an hotel close by. I showed them the way. I was not injured. Porter Pollard, of South Molton, who was going back as spare breaksman, was in another break compartment of the front carriage at the time of the collision, and I found his break on after the collision. My train consisted of two composites, Nos. 253 and 217, and third class, No. 400. The train had been keeping correct running time all the way from Taunton. The night was wild and stormy; first sleet, and from Anstey, snow. The distance from Anstey to Molland is over $4\frac{1}{2}$ miles, and the time occupied in running was ten minutes up to the time of the collision. The driver did not overrun any other station, but there was more difficulty than usual in stopping, owing, I think, to the slippery state of the rails. I have been working the same trains this driver has been driving for 20 months, and have always found him a very steady driver. I was riding in the last carriage. We were running our usual speed all the way. There was no one on the engine but the driver and fireman, and both were quite sober.

James Elston, driver seven years, states: I was driver of the 9.20 p.m. up train from Barnstaple on the 11th November. I left Barnstaple right time, with one carriage and guard's van, and took on two waggons at Swimbridge, one empty and one loaded. On nearing Bishop's Nympton and Molland I noticed the signals were against me. I pulled up at the distant-signal, and was drawing up very gently to the home-signal. When within 70 yards of the home-signal the down train met me. I never saw it until it was within two engines' length of me, and did

not hear any whistle. It was snowing fast and blowing hard. I never saw the lights of the down train, as they were covered with snow. I had reversed my engine, and was in the act of moving the regulator, when the collision took place. The buffer-plank of my tank-engine, No. 2,039, was broken, and both framings bent, and the bogie frame was broken. I heard no complaint of injury from any passengers in my train. Neither myself, mate, nor guard were injured, and the engine and vehicles kept the rails. I had very nearly stopped when the collision occurred. I couldn't see the signals very far, as the snow was blowing against them.

Henry Govier, guard, states: I left Barnstaple in charge of 9.20 p.m. up train to time. The train consisted of engine, No. 2,039, one composite, No. 24, and break-van, No. 11,055. Second guard, William Browning, took on two trucks at Swimbridge. We left South Molton 9.52, arrived at Molland distant-signal 10 p.m., and pulled up dead there. The driver opened his whistle, and drew slowly inside signal. I heard the break-whistle just after we began to move, and went to the break, but before I could screw it down I felt we had come into collision sharply with, as I supposed, an engine. I was thrown forward, but not injured. I jumped out, went forward, and found we had been run into by the 8.40 p.m. down train. I noticed the up signals, distant and home, at danger, burning clearly. I attended to my passengers, who all three complained of being shaken, but did not appear to be seriously injured. One walked back to South Molton, who should have been left at that station, but was asleep, and so was brought to Molland. The other two went from Molland to their home at East Anstey in their own conveyance. There was a storm of rain and sleet at the time.

Frank Pollard, porter three years, states: I am employed at South Molton, and proceeded to Taunton with the 5.55 p.m. up train from Barnstaple, in consequence of a rule that when there are more than five vehicles in any train an extra breaksmen is to be sent with it. I returned from Taunton in the 8.40 p.m. down train, and was in the break compartment of

the carriage next to the engine. I can't say much about the speed, but I don't think we were running very fast from East Anstey, or any faster than usual. On approaching the down distant-signal at Molland the driver sounded his whistle for the guards' breaks, and I applied my break as hard as I could screw it up. The break-blocks were certainly rubbing hard, but I can't say whether the wheels were skidded or not. The collision was not very violent, but it knocked me over against the side of the carriage. We were not going more than a walking pace at the time. It was a snowy, slippery night.

Walter Hole, station-master, states: I was on Molland platform on the 11th November at 10.0 p.m., waiting the arrival of the 8.40 p.m. down and the 9.20 p.m. up trains. I heard the 9.20 whistle for a signal to come in, and at the same time I heard the break-whistle of the 8.40 p.m. down, and noticed her coming in unusually fast. She ran by the platform with the guard's breaks tightly on, and into the 9.20 p.m., which was about 200 yards from the end of the platform. I ran to the place of the accident and found both the engines in contact, and both badly damaged. There were three passengers in each train, and none then complained of injury. They all walked to the station, and all, excepting Mr. and Mrs. Carter of East Anstey, left before I returned again to the office. Some half an hour after this I had information from one of our men that a passenger at the hotel had sent for a surgeon, Mr. Sanders of South Molton, and from him I learned that the passenger Mr. Thomas Goulding, banker's clerk, of Exeter, had one rib broken. I noticed the down signals, distant and home, burning brightly, and easily to be seen, giving "all right" signals. The up signals, distant and home, were also clear and bright, standing at danger. I cannot say if the front break was on, but I have no reason to think it was not on. The rear break was on hard. I have been two years in charge, and five years altogether at Molland, and do not remember any other instance of a passenger train overrunning the loop. It was a very unusual night, very changeable weather, sleeting and freezing alternately, and then snowing. The drivers and firemen were quite sober,

Conclusion.

This accident was caused by the driver of the 8.40 p.m. down passenger train from Taunton not having got his train under proper control when approaching Molland and Bishop's Nympton station, and so overrunning the station loop.

The weather appears, from all the evidence, to have been very bad, and no doubt the rails were in an exceptionally bad condition for making a stop on a heavy falling gradient, but a driver of 16 years experience, who had been driving on this line for over five years, ought to have been able to make the necessary allowance for such a state of affairs, and to have commenced to take all possible steps for stopping his train sooner in consequence.

Judging from the evidence of all the men with the train, and also from the recorded time of over 10 minutes for running $4\frac{1}{2}$ miles, it does not seem that this train, which was keeping correct time, was running at an excessive speed, and it is extraordinary that this being so, the breaks on the engine, and two out of the three vehicles in the train, should not have been sufficient to pull it up.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.
F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on 28th December 1878.

GREAT WESTERN RAILWAY.

SIR,

17, Queen's Gate Terrace, 14th December 1878.

IN compliance with the instructions contained in your minute of the 30th ultimo, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the collision that occurred on the 26th ultimo at Horrabridge station on the Great Western Railway.

A goods train belonging to the London and South-Western Railway Company (which company has running powers over this part of the Great Western system) broke in two parts as it was approaching Horrabridge station, and the hind portion ran into the front portion of the train at the station.

The guard in charge who was travelling in the front break-van was killed. This break-van was a good deal damaged. A meat waggon, which was next, mounted the van, was also damaged, and two of its wheels left the rails, and the sixth waggon from the engines, which was a waggon belonging to the Great Eastern Railway Company, was also damaged. The fastening of the draw-bar of this waggon gave way. The permanent way was very little injured. The railway is a single line with a loop for up and down trains to pass each other at Horrabridge. It is worked on the block system in connection with the train staff. Yelverton block station is about $1\frac{1}{2}$ miles south of Horrabridge. The line falls from Yelverton to Horrabridge with steep gradients of 1 in 110, 1 in 104, and 1 in 60, except two short breaks of 4 chains and 7 chains long, which are level. The line through Horrabridge is level, after which it again falls on a gradient of 1 in 60. It curves to the left as it approaches Horrabridge from the south, but it is straight through the station, which is well protected with home and distant signals, which are interlocked with the points and are worked from a raised signal-cabin. The station is also provided with starting-signals in both directions. The evidence is as follows:—

Evidence.

William Heard, breaksman in the London and South-Western Company's service, states. — On Tuesday 26th November I took charge of the rear van of the 5.40 p.m. train from Friary, as far as Laira junction. At Laira junction my train was joined to the 5.45 p.m. goods from Devonport, and the combined trains, consisting of two engines and tenders, three break-vans and 26 waggons, started from Laira at 6.5 p.m. to proceed to Exeter. Guard Martin, the deceased, was in the front van, and in charge of the train, the van in which I was riding being the middle one of the three, and the 18th vehicle from the train engines. Steer was in the van at the tail of the train. On approaching Horrabridge it was very dark and the signals were against us, until we slowed to about five miles an hour, and the engines were within about 100 yards of the stop-signal, then the stop-signal was taken off. I immediately took off my break which had been put on shortly after leaving Yelverton tunnel, and the speed of the train increased to about seven or eight miles an hour on entering the station, when we came to a sudden stop which I thought was caused by the breaks of the engines having been suddenly applied. I got out of my van on the up platform and went to the front of the train, thinking there were some waggons or road box goods to go on. I then found that a collision had occurred, and on going to the other side of the train I saw the body of Guard Martin between the front van and the following vehicle, which was a meat van, the latter of which had mounted the break-van and squeezed the guard to death as he was standing on the foot-board at the end of the van. I do not know when or where the train became divided and did not know that it was divided until I saw the collision had occurred. My break wheel is inside my van. I heard no whistling for signals.

John Steer, breaksman in the London and South-Western Company's service states:—On Tuesday 26th

November I took charge of the 5.45 p.m. goods train from Devonport to Exeter as far as Laira junction at which place my train was joined in the usual manner to the 5.40 p.m. train from Friary, and the combined trains left Laira junction at 6.5 p.m. to proceed to Exeter formed as follows:—

Engine of 5.45 p.m. goods from Devonport.			
" 5.40 "	"	"	Friary.
Break-van	"	"	"
16 waggons	"	"	"
Break-van	"	"	"
10 waggons 5.45 "	"	"	Devonport.
Break-van	"	"	"

with a guard in each van.

The train continued on its journey in the same formation (the van in which I was riding being at the rear.) On nearing Horrabridge the distant-signal was at danger and the train slowly approached the stop-signal, which was also at danger. I had commenced putting on my break just after passing through the Yelverton tunnel, which is about a mile south of Horrabridge, and I kept it on partially until after the home-signal at Horrabridge station showed all right. I did not feel any jerk when the train started again, after being checked just before reaching the home-signal. The front part of the train was within about 50 yards of the stop or home-signal when the stop-signal was pulled off. There was no whistling before it was pulled off. I immediately took off my break which I had put hard on directly I found the signal to be at danger, and the speed of the train gradually increased to about five or six miles an hour as we ran into the station. My van had passed the west end loop points by about two lengths when the train came to a sudden stop. I thought the breaks on the engines had been applied suddenly but did not think anything wrong had happened. I saw Breaksman Heard who was in the middle van get out and go to the front of the train and I remained in my van for five or six minutes looking out for a signal from the front guard

and expecting the train to start every minute. Breaksman Heard then called to me to come to the front of the train, which I did, and then found a collision had occurred. It was quite dark when we approached Horrbridge. I had not the slightest idea of when, how, or the exact spot the train became divided, as I did not notice any unusually sudden jerk with the exception of when the train came to a stand at the time of the collision. We had two side lights on the rear van and a tail lamp on the same vehicle. I have been a breaksman six months, five years in company's service.

T. Hicks, engineman, states.—I am in the London and South-Western Company's service, I was driver of No. 372 engine on the 26th November 1878, and left Friary, Plymouth, with the 5.40 p.m. goods at right time with 18 vehicles and an engine and tender and proceeded to Laira junction, where my train was attached to the 5.45 p.m. goods from Devonport, making the train up to 29 vehicles, my engine was next to the train and No. 360 engine (Powell, driver), was in front of mine. We left Laira junction at 6.5 p.m. (right time). On approaching Horrbridge the signals were at danger and we had nearly stopped. The home-signal was then taken off, we proceeded into the station and were drawing up before reaching the starting-signal, which was at danger, when we received a jerk as if something had run into us, pushing us ahead two or three feet. I got from my engine on to the platform and saw that the waggon behind the guard's van had mounted the buffers and run into the middle of the break-van. I called out to the guard but received no answer. I got my hand-lamp and found him jammed in between the ruins of the waggon and van. I afterwards found out that the train had parted through the pin of the draw-bar of No. 10,209 Great Eastern waggon coming out or breaking, but I saw nothing of it until the waggons ran into us at the station. I think that it was the hind draw-bar of the sixth vehicle from the tender that gave way. I think we were not moving more than one mile per hour when the hind part of my train ran into the front part. I gave my engine a little steam when the home-signal was taken off, and again after my engine had passed the home-signal.

W. Powell, engineman, states.—I was driver of the London and South-Western No. 360 engine on the 26th November 1878. Left Devonport at 5.45 p.m. (right time) with the Devonport goods (up) with 11 vehicles, one engine and tender. On arriving at Laira junction my engine was unhooked, and I ran ahead to allow the Friary goods to come out on the main line and be attached to my train, making the train up to 29 vehicles (26 waggons and three break-vans) two engines and two tenders, the Devonport portion being in the rear and the two engines in front. My engine was then attached to No. 372 engine, T. Hicks, driver, who was next the train. We then left Laira junction at 6.5, right time, and on approaching Horrbridge station the signals stood at danger in consequence of having to cross a Great Western train there. On arrival of this passenger train, which I observed by green lights on it, the signal was taken off for us to go into the station. On arriving at the platform, the station-master changed the train ticket as we were slowly passing, my mate taking it from him, the starting-signal still being on against us. I whistled for it to be taken off; just as it was taken off I looked around to see that the train was all right, when I saw a red light waved from the platform. I told my mate to put on his break, and before he could do so something ran into us, knocking us slightly ahead. I got off my engine and went back and found a meat van which was next to the front break-van, had run into this van, leaving the front pair of wheels on the rails, and the waggon next to the meat van was off one pair of wheels. I looked about for the guard when I heard some one from the other side call out for some one to come around as there was a man killed. I went round

and found the guard was jammed in between the waggons and the van. He had his arm around the hand-rail of the van as if he had been looking out for the signal from his mate. It was very dark at this time, and I believe the person who called out that a man was killed was a passenger in the Great Western train which was standing in the station opposite the front portion of the train. The cause of the accident was the coupling pin of No. 10,209 Great Eastern waggon breaking or coming out, I cannot say which, and allowing the hind portion of the train to run into us, as it was a falling gradient of 1 in 60. This waggon was the fourth or fifth from the front van. I cannot tell where the train parted, as I felt nothing whatever amiss till the waggon ran into us. We had no occasion to stop at Horrbridge, but only to slack to change the staff or train ticket. I had not put on steam at the time of the collision.

Francis Wright, fitter, in charge of carriage department Great Western Railway at Plymouth yard, states.—I produce the pin which I took from No. 10,209 Great Eastern waggon, which broke and allowed the hind draw-bar to be pulled out of the waggon of the London and South-Western Company's 5.40 p.m. goods train from Devonport. I found the pin on the under framing of the waggon. It is the usual size pin used for that purpose. There is no flaw in the fracture. The iron appears to be of fair quality, but hard and short in the grain. I found the other end of the pin on the wood framing close to the spring, and the head had been driven into to the inside of the sole piece of the waggon next to the platform, having evidently been shot out of its berth with some force when it broke. The iron plate on the head-stock, through which the draw-bar passes, was broken, and found by our men about a quarter of a mile south of the Horrbridge home-signal. This plate was no doubt broken by the draw-bar being pulled through it.

Robert Ferres, signalman at Horrbridge, in Great Western Company's service, states.—I was on duty 26th November when the London and South-Western express goods approached Horrbridge station. The train was telegraphed from Yelverton about 1½ miles south of my station, and I gave Yelverton "line clear" at 6.36 p.m. Yelverton gave "train on" at 6.38, and at 6.40 I took off my signals for the goods train. I did not take them off sooner as the mail to Plymouth had not reached the station. The line is single, and there is a crossing loop line at Horrbridge. I do not know that the goods train was checked at all by my signals, as I did not hear the driver whistle. The goods reached Horrbridge at 6.42. The mail reached the station at 6.40. I did not take off the up starting-signal at Horrbridge for the goods train until the mail had drawn up at the station and I saw the tail light of the mail. I took off my starting-signal as the goods train engines reached my cabin. The up starting-signal is about 40 yards north of my cabin. The goods train had not come to a stand when I took off the starting-signal for it to proceed. I was aware that the driver of the goods train had got the staff ticket as I got the "all right" signal from the station-master. I never take off my starting-signal till I have "all right" from the station-master to show that he has given the driver the staff or ticket to proceed. I have been a signalman about three years. After I took off the up starting-signal I saw that the goods train was divided. I had not taken off my down starting-signal for the mail train at this time, as I do not do so till I see the tail lamps of the crossing train. I think there was a distance of about three waggons between the front and hind portions of the goods train. The hind portion of the goods train ran into the front portion close to the starting-signal. The front portion was nearly at a stand at this time. I did not see that the engine-drivers had put on steam at this time. The hind portion was running about eight miles an hour at the time of collision. When I saw there was going to be a collision I could do

nothing to prevent it, but I ran down and found the second waggon from the engine had mounted the van next the engine, and the guard, who appears to have been standing on the foot-board at the back of his break-van, was killed. I did not see whether the breaks had been on any of the break-vans or engine tenders at the time.

Benjamin Drake, station-master at Horrabridge, states.—I was on duty at the station on Tuesday 26th November 1878. The 5.40 p.m. down mail train ex Launceston arrived at 6.40 p.m., and I collected the staff from the driver, and went to the signal-box and took out a ticket from the train ticket box to hand to the driver of the 5.45 p.m. up London and South-Western goods train. I saw the head lights of the London and South-Western train, which was approaching the station, and I then crossed from the down to the up platform to hand the train ticket to the driver of the goods train. The 5.40 p.m. down Great Western train was then standing at the station, waiting to cross the up South-Western goods train. The engines of the South-Western goods train passed me whilst I was standing on the up platform, at about four miles an hour, and I handed the train ticket to

the driver of the front engine. There were two engines attached to the front of the train. The starting-signal was not then pulled off, and the driver sounded his shrill whistle for it to be pulled off, which was done. I then noticed that there were only six vehicles attached, and not seeing the tail lamp, I turned the red light of my hand-lamp, and showed a danger-signal towards the other part of the train, which I saw by the side lamps on the rear van had broken away. The driver may have seen my danger-signal momentarily as I turned it on in my lamp, but that must have been all. The distance between the first and second part of the train was about the length of seven trucks, and the collision occurred almost immediately after I showed the danger-signal. A meat van mounted the front guard's van, and smashed the body of it. I immediately went to the front part of the train and found that the head guard had been squeezed to death in his van. A doctor was sent for at once. The second part of the train passed at a speed of seven or eight miles an hour. I did not notice whether any breaks were on the hind part of the train that had broken loose. I have been 14 years a station-master, and 11 years at Horrabridge; 20 years in railway service.

The goods train that broke in two was made up of two goods trains, one from Devenport which left that station at 5.45 p.m., and one from the Friary, which left that station at 5.40 p.m. These trains were joined together at Laira junction, and on leaving that station at the proper time, 6.5 p.m., the united train consisted of two engines and tenders, a break-van with the guard in charge, 16 waggons, a second break-van with a guard, 10 more waggons, and a third break-van with another guard at the tail of the train. The vehicles were marshalled in the order that they are given.

The train was timed to pass the down passenger train at Horrabridge, which obliges the engine-drivers to approach the station cautiously.

On the night in question, which is reported to have been very dark, the Horrabridge up distant and home signals were at "danger" when the goods train approached. The down passenger train was entering the station at the time, and the goods train was being stopped inside the up distant-signal by the engine-drivers and guards, when the up home-signal was lowered to "All right," upon which the driver of the second engine put on a little steam, the guards in the middle and tail vans and the firemen took off their breaks, and the goods train ran forward into the station.

No one observed that the goods train had separated in two parts at the place where steam was put on, until the front of the goods train was being stopped in the station in consequence of the starting-signal being at danger.

The station-master, who was the first to observe it, held out his hand-lamp with a red light towards the rear of the train. There was about the length of six or seven waggons between the front and rear portions of the train at this time. The hind draw-bar of the sixth waggon had been pulled out of the waggon in consequence of the pin breaking, by which it was attached to the buckles shrunk on to the draw-bar spring. The pin that broke was $1\frac{1}{2}$ inches in diameter, which is the usual size. The iron was sound and good, but appeared rather hard and short in the grain.

The draw-bar was pulled through the cast-iron face-plate on the head-stock of the waggon. This plate was pulled off and broken in two, the pieces were picked up about a quarter of a mile to the south of Horrabridge station, showing plainly that the train separated at this spot.

The accident was probably caused by the jerk given to the train when the driver of the second engine put steam on.

The weight of the two engines running forward, when all the buffers of the waggons were close together, and when certainly two, but probably all three guards had their breaks on, gave a jerk which broke the pin.

One end of the pin had dropped on to the frame close to where it had been fixed, and the head was shot horizontally across the waggon and was found firmly fixed in the side frame, from whence it was extracted with a cold chisel, thus affording strong evidence of the force that was applied when it broke.

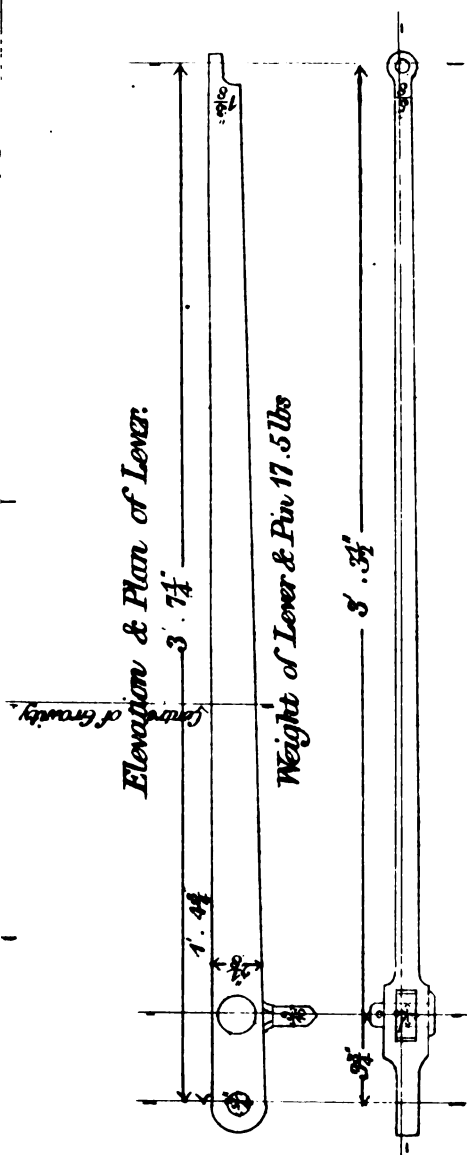
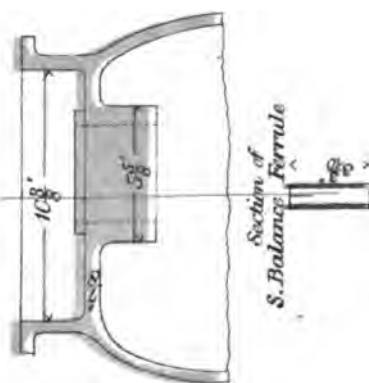
An accident of the same kind happened to a similar train at the same place on the 5th instant, but fortunately it was not attended with personal injury to the servants in charge of the train.

The dangers attending trains that require more than one engine to draw them have frequently been mentioned by all the inspecting officers, and are well known to all

To accompany Colonel Rich's Report
dated the 14th December 1878.

FLANGE OF CAST IRON DOME &c LAGO ENGINE.

*Elevation of Dome
Section through A.B.*



Note. Flange, Scale. Quarter Size.
Dome &c, Scale, One Eighth Size.

It was stopped March 22nd, 1878, for a few general repairs, and was sent to Newton, and afterwards taken into shops March 24th, 1878, a few slight repairs were done to the boiler, &c. It was tested with cold water June 19, and left the shops again October 30th, and was sent down to Penzance November 11th, where it was working up to November 30th, the day of the accident.

Damage done to engine Iago by the safety seat failing, November 30th:—

Safety valve seat broken.

Spring balance screw broken.

" lever slightly bent.

Big whistle bell dented in slightly.

Weather board glasses broken.

Cleaving on top of fire-box slightly disarranged.

Baffle plates inside part of boiler over fire-box disarranged.

Brass dome damaged.

Exeter, March 27th, 1878.

Locomotive Department.

Report of repairs required to Iago engine.

Wheels want turning up. Axle-boxes and brasses all want examining. Both slide valves and pistons to be examined; both big and little ends want examining. Eccentric want letting together. Motions want adjusting, and all glands bushing. Outside rod brasses lining up. All valve gear and bolts to be examined. Both injectors and top clacks to be examined. Gauge and cylinder cocks and whistles want grinding in. Left-hand driving wheel tyre loose. Feed valves and strums to be examined. Tank leaking in several places, plate very thin. Break gear to be examined. Break holds very bad; more leverage wanted. Fire-box and tubes to be examined. Lubricators to be examined and cleaned out. Bolts, &c. in foot-plate framing to be examined.

Engineman WILLIAM BAKER.

(Signed) THOMAS HARLE.

GREAT WESTERN RAILWAY.

Locomotive Department.

REPORT OF REPAIRS done to Iago engine at Newton Station.

BOILER WORK.

Date came in shop, March 24th, 1878.

Date finished, October 30th, 1878.

Name of leading man, John Kent.

Tubes.—Four old tubes taken out of the boiler, and four new ones put in.

Inside fire-box.—Old seams caulked 17 feet. Safety plugs examined, both of Great Western Railway pattern. Brick arch renewed, and new smoke deflector, and 16 new fire-bars put in.

Outside fire-box.—Small patch put on the back plate over the fire hole, ten mud holes retapped, and two bushed and retapped, and ten new plugs put in.

Boiler barrel.—Old seams caulked 41 feet. Rivets and stays caulked 89. Water space cleaned out. Old rivets taken out, and new put in 13. Left-hand side and bottom of the tank repaired cleaned out; and both strums examined. All loose rivets taken out of the foot-plates, and the ash pan repaired.

Remarks.—Boiler tested with cold water June 19th to 140 lbs.

Wheels.—Wheels and axles examined, tyres turned Nos. on axles driving 5727, trailing 2829, leading 2828.

Springs.—All springs reset and spring gear repaired.

Framing.—Both frames taken down and repaired. Patches put on right-hand frame over driving axle. Bottom stay's repaired. Trailing stays renewed.

Cylinders.—Left piston renewed. All piston rings renewed. Piston rods turned and valve spindles renewed. All glands bushed and new neck rings. Cylinders and cylinder faces faced up valves reset thickness 11/16".

Motion.—Horn blocks lined and fresh bolted. Right driving and leading blocks renewed. Axle boxes refitted. Motion bars, faced blocks re-metalled and fitted. Expansion gear and radius rods repaired, weigh shaft renewed. Eccentric straps and sheares refitted. Inside and outside connecting rod brasses refitted, sheares keyed on.

Miscellaneous.—Tank lifted, new wood cleading on boiler, brake gear repaired, top of brake screw and handle renewed. Injector steam cocks. Water gauge cocks, pet cocks and steam chest cock ground in. Shrill whistle repaired and break whistle renewed. Injectors and clack valves repaired. Safety valves ground in, and all joints made. Sand gear repaired.

Robert Wallace, fitter, states.—I was chargeman in charge of the repairs to Iago engine. I had the dome taken off and the valve seats faced in the lathe. I examined the dome and made the joints between dome and boiler on the 18th June, and the boiler was tested to 140 lbs. with cold water 19th June. One of the dome joint studs right in front was leaking when tested, the joint was then broken and a new stud was put in and the joint remade the same day, when the dome fixing was completed. The engine was finished and tried in steam 30th October, when the safety valves were adjusted and everything about the boiler was tight. I was on the top of the boiler when the engine was tested with cold water, and then noticed the slight leak at the stud mentioned. I made the joint the first time with gauze wire and cement and a little bit of lamp cotton inside the studs. The joint was made again in the same way, and on the same day as the engine was tested. The seat on the boiler was a little hollow and I used the lamp cotton for this reason. There were three new studs altogether put in, the other two were worn away and required to be renewed.

John Luxmore, Esq., locomotive superintendent at Newton Abbot.—Iago engine was tested 31st October with 120 lbs. pressure of steam and appeared steam-tight. The brass cover of the dome was on at the time the engine was tested.

John Ivey, foreman of Penzance running shed, states.—The Iago engine arrived at Penzance on the night of Monday 11th November 1878, working the 6.10 p.m. passenger train ex Plymouth, Richard Hurst being the engineman. This engine on that day had taken the place of the Plato engine which Richard Hurst had worked to Plymouth with the 11.15 a.m. passenger train ex Penzance, the exchange of engines having taken place at Plymouth. The Plato was stopped at Plymouth in order to be sent into shops for general repairs. Since 11th November the Iago has been working the 11.15 a.m. mixed passenger train from Penzance to Plymouth, returning with the 6.10 p.m. passenger train, Plymouth to Penzance, about five days every week, on the sixth day, generally Thursday, the engine being stopped in shed to be washed out and attended to. After arriving with the 6.10 p.m. down passenger train on Wednesday 27th November, Richard Hurst reported as follows:—

"Iago dome joint wants making and R. H. cylinder cover joint making, L. H. trailing spring links broke, and smoke-box want bricking up, draws air.

("Signed) R. HURST."

On the following day Thursday, the engine was in shed and the fitter commenced the repairs. There were no spare spring links at Penzance, and the broken ones were sent to Carn Brea shops the same day, and were received back on the Friday morning. On Saturday morning the links were put on, but it was then found that the spring pin was bent, and we

could not get the links in, and the spring pin had to be taken out to straighten it, and the fitter could not complete the job in time for the engine to work the 11.15 a.m. train. I therefore arranged for the Plymouth engine, which had worked down the 6.50 a.m. passenger train ex Plymouth (which engine should have worked up the mails) to work up the 11.15 a.m. train, and I appointed the Iago to work the 3.50 p.m., for which train it was ready in good time. I looked round the engine before it went back to the station, and saw nothing amiss. When the explosion occurred I was sitting in my office at the engine shed, 300 yards from the station. I heard the noise, but it did not alarm me. However, I got up and went to the office door, and looked down the shed, as I thought the sound proceeded from the shed. As I was standing in the doorway, a porter ran up from the station, and said Mr. Bone had sent him up, as the mail engine had burst its boiler, and another engine was wanted for the mails. I asked him if anyone was hurt, and he said no. I then ran to the door, and met the station-master, Mr. Bone, coming in. He asked for an engine. I then hurried back towards the station, and told George Ventham, engineman of No. 2,124, which was standing in the sea siding, near the west end of the engine shed, after arrival with the 11.0 a.m. passenger train ex Plymouth, to pull the Iago down to the shed, and to get ready for the mails. He did so, and then turned and coaled and took water, and went back to the station at once, and the mails started 27 minutes late. When the Iago was brought back to the shed I had the hose pipe put on, and water thrown on the fire, which was then deadened down considerably. I examined the engine, and saw that the safety-valve seat or dome had broken off all round the flange. I saw a sign of a flaw in the casting about $8\frac{1}{4}$ inches long, and on the front side. This part looked dirty and dull, whilst the other part of the fractured casting looked bright, and there appeared to be, both inside and outside at the flaw, a little piece holding, and about the thickness of a tin plate. I found the big whistle had had a blow on the front side, the weather board glasses both sides were broken, the brass dome was broken, and spring balance screw broken, leaving a piece on the balance about $2\frac{1}{2}$ inches long; the cleading on top of the fire-box was damaged, and baffle plates inside the fire-box displaced, loosened from their fastenings, and bent a little. I do not know whether the fire-box was injured. I opened the blow-off cock afterwards when the engine was cool, and found no water at all in the boiler. When I went back to the station I found the cast-iron dome and the brass outside dome had fallen through the roof of the station and into a 1st and 2nd composite coach, No. 302, and had lodged on the floor of the coach. I had it brought down to the shed, and I examined it and found the safety valves both in their places, and the spring balance lever in its place, and not bent. The safety valve was acting all right. The spring balance, after the explosion, was, I think, hanging down by its attachment to the fire-box. No one was injured, to my knowledge, although I heard that some man in the road had had a blow from a small part (one of the square bottom pieces) of the brass dome, which part had separated from the rest of the brass dome, and was found in Market Jew Street, about 80 yards further on beyond where the hole was made by the dome in the roof. The coach No. 302 was sent away to Swindon with the 6.50 a.m. passenger train on Sunday December 1st. The Iago's dome joint had not been reported to me before the 27th November.

Nicholas Rowe, fitter, Penzance, Great Western engine shed, states.—On Thursday morning at about 9.45 a.m. I commenced to take off the safety valve seat or dome of the Iago engine in order to make the joint. When I had taken the brass dome off I noticed that the joint had been blowing, principally at the fore and back part, and at the stud holes at these parts. I noticed also a little white sediment at some other parts. I took the dome off; the old joint

was made of a double thickness of gauze wire and cement. I cleaned both faces. I did not try the faces with a straight edge. The faces looked very fair. I made the joint with two thicknesses of gauze wire as before, and a few threads of lamp wick around the studs inside; none of the studs were broken, and they all appeared good. I replaced the dome and screwed it down myself carefully. I noticed no flaw or crack in the casting, and I saw nothing amiss with it. On Saturday, when the steam was up, I got up to look at the joint and found it all tight. I saw no steam escaping from the dome whatever. There was about 40 lbs. pressure of steam at the time. I knew of no defect in the casting at all. I was about half-way between the shed and the station and on the turn-pike road when the explosion occurred. I heard it and saw the dome in the air. I hurried to the station, and on arrival there I found the Iago being taken to the shed by No. 2,124 engine. I have examined the casting and am of opinion that there has been a flaw in the flange about 4 or 5 inches long in the front part. I noticed no sign of this flaw when I had the casting off. I had no difficulty in getting the dome off, it came off very easily. After taking off the dome and seeing how the joint was made, I said to my mate, "We shall have some trouble with this joint as it is made with a double thickness of the gauze," that is to say, with a double part inside the studs. I think the screw balance was hanging down.

Richard Hurst, engineman, states.—I was booked to work the 11.15 a.m. up mixed passenger train from Penzance to Plymouth on Saturday, November 30th, but the fitter not having finished the work he had to do at the engine Iago, I was appointed to work the 3.50 p.m. up mails instead. I went back to the station with engine Iago when it was ready, and was attached to the train, and just as the guard was about to blow his whistle, or about half a minute or so to starting time, the safety valve seat and dome was blown off and fell down through the roof of the station. I was standing on the foot-plate at the time in readiness to start. I had noticed nothing at all amiss with the engine, and the dome joint was perfectly tight, and I had no suspicion that anything was wrong. I had just before come down from filling the lubricator. At this time there was hardly 100 lbs. pressure of steam according to the gauge. The spring balance had not been screwed down by the fitter, and my mate was in the act of screwing it down when the explosion occurred. I believe it was fully screwed down to 120 lbs. pressure when it exploded. There was a ferrule on the spring balance which was marked to gauge. I have not seen it since it was blown away. I was not hurt in the slightest degree, and no water splashed over me. I had a big fire in. I saw no water splashed out. The engine was just beginning to blow off before my mate commenced to screw the spring balance down. I had a full boiler at the time, the water being close to the top of the glass. The water was blown out of the boiler, I cannot say whether in the form of steam or water, but none left in the glass. As soon as possible I got the fire buckets out of the station, and with assistance threw water in the fire. No. 2,124 engine was at the time standing near the shed in a siding, and this was brought out and took the Iago engine down to the shed where the fire was completely put out. On the 27th instant, after arrival from Plymouth, I reported the "dome joint of the Iago wants making;" this joint was made before I took the engine out on the 30th. This was the first time the dome joint had blown since I had the engine. I took charge of the engine at Plymouth on the 11th November, when it came from Newton workshops. I did not notice the position of the spring balance after the explosion, or whether any part of it was broken. I have been an engine-driver since 1851.

George Couch, fireman, states.—I am Richard Hurst's fireman. I came on duty at 10 a.m. on

Saturday November 30th, and found that my mate had to work the 3.50 p.m. up mails, instead of the 11.15 a.m. I therefore went home and returned again about 2.30 p.m.; I found the engine in shed on No. 1 pit. I made up the fire and noticed that the water was as high as half an inch from the top of the glass, and there was about 40 lbs of steam in the boiler. I took the engine out to the coal stage and had 27 cwt. of coals put on. I was alone on the engine at this time. I then came back for water and my mate was then at the shed, this would be before 3.0 p.m. We left the shed about 3.35 p.m. and went back to the station, the engine was not blowing off then. Whilst standing at the station I screwed the spring balance down, and I was standing on the trailing spring on the left-hand side doing this when the explosion occurred; my mate was on the foot-plate at this time. I was not at all hurt by the explosion, nor was I knocked off the spring, but I stepped back myself before I commenced to screw the spring balance down. The pressure as shown by the pressure gauge was close upon 100 lbs. The steam was just beginning to blow off at the safety valves before I screwed the balance down. I got off the engine after the explosion and assisted my mate to put water on the fire.

Robert Wallace, chargeman, further states.—When the engine Iago was tested with water on the 19th June I got up on top of the boiler and fire-box to see that the safety valve seat joint was tight and the studs alright. There was no leakage from the joint, but there was a little water oozing up between one of the nuts and its stud; this stud was just in the front of the seating. There was no other leak than this at the joint or at any part of the seat. I saw no sign of any crack in front, and if any water had been coming through a crack in front I must

have noticed it. I saw the engine tried in steam on the 30th October, and travelled with it on the trial trip to Totnes and back, 17½ miles. The brass dome was on at this trial. I got up on the boiler and fire-box before the engine started on its trip, in order to examine the safety valves and see if they were blowing at all or required any further facing up. I looked right down on the top of the valves. I saw a slight blow at one of the valves. I could not see the joint itself, but if it had been blowing I should have detected it by seeing the steam coming out under the brass dome. I saw no steam at all coming out under the brass dome. If any steam had been issuing from a crack in front of the seating it must have made its appearance from under the steam dome. I heard no blow of steam at all nor any whistling of steam. There was no crack, in my opinion, in the seating right through, or it could scarcely have escaped notice. When I had the seating off on the 18th, previous to the water test, I examined it carefully inside, I also sounded it with my hammer, and I could detect no defect at all. After returning from the trial trip on the 30th October, I got up on the boiler again, and could see no blow at all from the joints.

Thomas Chicken, fitter, states.—It is my duty to test the safety valves of all engines going out of the repairing shops at Newton Abbot, and to adjust the same. When the engine Iago was being prepared for its trial trip on the 30th October I got up and looked at the safety valves. I noticed the lock valve was blowing slightly. I saw no steam blowing from the joint. If any steam had been escaping from the joint it would have made its appearance underneath the brass dome. I did not notice any whistling or blowing of steam except from the safety valve. The lock valve was taken out the next day and ground in and replaced.

The dome that gave way was of the pattern generally used on the broad-gauge systems at the time the Iago was built. The cast-iron was $\frac{1}{2}$ inch thick, and the dome 15 inches in diameter, outside measurement. It broke at the flange, as shown on the accompanying drawing.

There was one flaw in the front, about $8\frac{3}{4}$ inches long, which extended almost through the metal, and another small flaw close alongside, which was about $1\frac{1}{4}$ inch long, and extended about half-way through the metal. These flaws and the fracture caused by the dome being blown away, formed a clean and nearly level fracture all round the flange of the dome, by which it is fastened with 20 studs to the top of the boiler.

It appears from the evidence that when the Iago engine was tested on the 19th June, after it had been repaired at the company's workshops at Newton Abbot, that the dome leaked in front, and that the fitter thought that the leak was at one of the studs. Three studs were renewed, and the dome was taken off, refixed, and again tested on the 31st October with 120 lbs. pressure of steam. It appeared all right, but the brass dome cover was on at this time. The engine was sent out to work on the 11th November, and on the 27th, which was the 17th day that the Iago had been working between Penzance and Plymouth, a leak was again observed by the engine-driver in the front of the dome. The engine was taken to the workshops at Penzance, the dome was taken off, and the fitter who was employed on this work stated that he noticed that the joint of the dome with the boiler had been blowing, principally at the fore and back parts, and at the stud holes at these parts. He repacked the joint, replaced the dome, and looked at it on the 30th November, when the steam was getting up for the Iago to take the 3.50 p.m. train to Plymouth. When the fitter looked at the engine the pressure of steam was only about 40 lbs. The fireman subsequently took the Iago to Penzance station, where he was joined by the engine-driver. The spring balance was only screwed down to 100 lbs. pressure, but the ferrule was arranged and the engine was intended to work up to 120 lbs., and as steam was blowing off at the safety valves, the fireman screwed down the spring balance to 120 lbs. As the screw reached the 120 mark the dome blew up.

Although the fitters at Newton Abbot and at Penzance believe the steam to have escaped at the studs, when the engine was sent for repair, I cannot help thinking that the steam was escaping at those times at the flaw which was just behind and inside the studs. I quite absolve these men from all blame for not discovering the flaw

under the tests that were applied; but I think that engines, before being sent out to work, when they are tried or after undergoing repairs, should be tested with a greater pressure of steam than they are intended to be worked with.

I would further suggest that firemen should not be allowed to move engines unless the driver is with them. These men should always work together, and no engine should be moved without two men being present with the engine.

The cast-iron domes are no longer used on the Great Western engines; they are now made of wrought iron.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
F. H. RICH,
Colonel R.E.

Printed copies of the above report were sent to the Company on the 6th January.

GREAT WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, 26th December 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 17th instant, the result of my inquiry into the circumstances connected with the two collisions which occurred on the 12th instant at Slough station, on the Great Western Railway, the first between an up passenger train and a goods train, and immediately afterwards another between a down passenger train and a break-van which had been detached from the rear of the goods train and thrown off the rails by the collision which had just occurred, and stood foul of the down line.

It is stated that no persons were injured in either collision. The two passenger train engines were very slightly damaged, and the passenger van of the up train had its side broken, and all the windows on one side of a third-class carriage were also broken.

In the goods train the van at the tail of the train and two trucks were completely broken up, and four other trucks were damaged.

The Windsor branch of the Great Western Railway, which was opened for traffic in 1849, is about $2\frac{3}{4}$ miles in length, and there are no intermediate stations between Windsor and Slough, where the branch lines join the main lines of the Great Western Railway.

The traffic is not worked on the absolute block system.

The connection between the up branch line from Windsor with the main lines of the Great Western Railway is protected by up home and distant signals, worked from a signal-box placed rather more than 70 yards west of the west end of the down platform in the fork between the main and branch lines. The up home-signal is 162 yards from the signal-box, and the up distant-signal is 308 yards from the up home-signal, and about 44 yards south of the bridge that carries the public road (Bath road) over this branch railway.

The junction of this branch line with the main lines at Slough is approached on a curve bending to the right, and having a radius of $17\frac{1}{2}$ chains for a length of 22 chains. This curve commences shortly after the branch line passes under the Bath road bridge, and on account of this curve and some intervening buildings the view is limited and the Bath road bridge cannot be seen from the west end of the down platform, from whence the down branch line trains start.

Evidence.

Samuel Panter, engine-driver two years and ten months, driver of engine No. 569, states.—I worked the 7.35 p.m. goods, Windsor to Slough, on the 12th December. Left Windsor right time with 28 trucks and van. After passing Chalvey road underbridge, we ran over two detonators, I think near the large packer's hut (known as "Gammon's Hut," but I may be mistaken as to the exact spot, as I was standing on the off side of the foot-plate). The detonators were as near as possible opposite the hut or a little on the

Windsor side of it. The fogman was showing a red light at the same time. I had shut off steam before I ran over the detonators. Just at the time of passing over them I first saw the light of the up distant-signal, which was at danger. I could not see it before. I passed the distant-signal slowly at about four or five miles an hour, and stopped dead just after the engine had passed through the Bath road bridge. I then drew ahead again up to the home-signal, and stopped just opposite to it. I stopped at the home-signal at

about 7.44, and stood there about a quarter of an hour. Just at 8 p.m. I looked at my watch and remarked to the fireman, "I don't hear the 7.50 up train from Windsor anywhere, it is time he was coming." My engine was blowing off at the time. Almost directly after this I felt the shock of something running violently into the tail of my train, and my engine was moved forward several yards. I had heard nothing of the following train until the collision happened. I had not heard any whistle from the up train. I went back immediately to see what was the matter, and seeing one of the trucks was across the down line, I ran back towards the station and showed a red light with my gauge lamp to the train which was coming out, viz., the 6.22 p.m. from Moorgate Street. That train did not stop in time but ran into the truck on the down line. I was about half-way up my train when the down train passed. I think it was running 12 or 15 miles an hour. The steam had been shut off when it passed me. It was on when I first saw it. The driver noticed me, sounded the whistle, and shut off steam. I crossed my engine to the down line, and assisted to clear the road. The collision with my train occurred about 8.18 p.m. It was a very foggy night.

George Hatton, chief goods porter at Windsor, states.—I left Windsor with the 7.35 p.m. up goods on the 12th December, acting as guard and riding in the van at the tail of the train. There were 28 trucks and van on the train, the greater part of the trucks being empty. The driver passed the Slough distant-signal slowly, four or five miles an hour, and went in slowly up to the home-signal, and stopped there. I got out of the van on the ballast, taking my hand-lamp and some detonators. I examined the tail lamp and found it burning bright and clear. After standing by the van seven or eight minutes, I heard two detonators go off in the direction of Windsor. I ran back towards Windsor with my hand-lamp showing a red light. I had got back about 150 yards, but had put down no detonators, when an engine and passenger train passed me running so fast that I feared it would run into my train. I did not notice whether steam was on or not, nor whether the breaks were being applied. I shouted out to the driver, "Can't you see my tail lamp? are you mad?" After the train had passed I heard the noise of a collision. I went back towards my train and met the porter, *Sanders*, who was acting as under guard of the passenger train, and who was coming back towards Windsor with a lamp in his hand. He said, "What shall I do?" I replied, "Go back towards Windsor," and he did so. I went forward to my own train. I did not go so far back as the distant-signal, but I went as far as the over bridge (Bath road bridge). I afterwards said to the driver of the passenger train, "You ought to have seen my tail lamp," to which he made no reply. I have worked as guard of the train in question nearly 12 months, and have been between 13 and 14 years in the service. It was not very foggy. I could see the back light of the distant-signal from the tail of my train. I did not hear the driver of the up passenger train blow the whistle. The break-van of my train was knocked off the up line on to the down line.

John Tucker, of Bristol, engine-driver between seven and eight years, engine 782, driver of the 7.50 p.m. passenger train from Windsor to Slough, states.—I left Windsor at 7.54 with 11 coaches on, including two break-vans with two guards. On passing the small fogman's hut, a short distance on the Windsor side of the distant-signal, the engine ran over two or three detonators. Just before passing over the detonators I saw a red light, shown by the fogman's hand-lamp. I shut off the steam on seeing the red light, and as soon as I ran over the detonators I blew the break whistle, and the fireman applied his break at the same time. Mine was a tender engine running with the tender first. The fog was so thick at the time that I did not

see the distant-signal until I had got nearly under it. I passed the distant-signal at a speed of from 15 to 20 miles an hour, nearer 15 than 20. I looked at my watch just about as we passed under the road bridge, and found the time was 8.1 p.m. We had just passed through that bridge when I saw a red light, and heard a shout from some one on the ground. I reversed the engine immediately, and blew the break whistle again, but almost at the same moment we ran into the tail of a train standing outside the home-signal. The speed at the time of the collision was so reduced that it could not have been more than five miles an hour. I received a blow on the head and was stunned for a few moments. My break whistle was blowing when I recovered myself, and I then shut it. My fireman and I were both on the foot-plate when the collision happened. I was not aware that the Windsor branch was not worked by block telegraph, and did not expect that we should be allowed to leave Windsor while a train was outside the home-signal at Slough. I have been into Windsor in charge of a train on only six or seven days altogether, but am perfectly well acquainted with the road and signals. I have never worked over the line as a fireman. The tail lamp of the goods train was burning, but I think not brightly.

George Dicks, fireman to J. Tucker, confirms this statement and adds:—After the collision I got off the engine to stop a train which I saw coming from Slough, but was not able to do so in time. The gauge lamp was knocked down and put out by the first collision. I went back to my own engine and waited till assistance came. I afterwards walked back and picked up three freshly exploded detonators close to the rail and about two yards apart. They were about 103 paces outside the distant-signal, and close to the *small* hut. I did not go as far as the large hut. I could not see the distant-signal until we got to within a yard or two of it, when we were running at from 15 to 20 miles an hour, nearer 15 than 20, the steam was shut off when we ran over the detonators.

Thomas Sanders, porter at Slough, states.—I acted as under guard of the 7.50 p.m. passenger train from Windsor, on the 12th instant, riding in the front van. When the train was just passing the packer's hut, known as "Gammon's" (the big hut), we ran over two or three detonators. I put my break on hard immediately, and was holding on my break, and looking out at the same time on the near side when I saw a red light apparently held up by some one on the ground. I continued to hold on to the break until I found my train run into something else in front and come to a stand. I did not hear any break whistle until we had run into the goods train, when I heard one blow, but I do not know by what engine. I did not see the distant-signal, nor the fogman's hand-lamp, and I heard no shout from the ground previous to the collision. I think the speed of the train was a little higher than usual all the way from Windsor; but it was somewhat reduced before the collision, though I cannot judge at all closely what the speed was when we pitched in. I was knocked down in the van. When we stopped I got out of the van and went back towards Windsor and met *Hatton* at the Bath road bridge. I spoke to him and then went farther back and protected the train. I took a packet of detonators which I found in the fogman's small hut, and went back and found the fogman, *Hunter*, near Chalvey road bridge, and walking towards Windsor. There was a fire in a bucket standing close to the *small* hut. I gave him the packet of detonators, and asked him to give me some, and he gave me three. I went farther back towards Windsor, until I met and stopped the 8.15 passenger train from Windsor. It was a rather foggy night.

James Gomer, branch guard, belonging to Windsor, states.—I was in charge of the 7.50 p.m. passenger train from Windsor to Slough on the 12th December. My train consisted of engine and tender, 11 coaches,

and one break-van. We started at 7.50, and when approaching the Slough distant-signal I heard the train run over three detonators, and put on my break in the break-carriage at the tail of the train immediately, and held it on until I felt the shock of a collision, and the train came to a stand. I got out of the van, ran ahead, and sent Sanders back, and then ran forward myself towards Slough to stop the down train, but was not in time to do so. I heard a break whistle blown directly after we ran over the detonators, while I was putting on my break. The speed of the train, was very much reduced between running over the detonators and the place of the collision, so much so that I feel sure the train would not have run up to the home-signal without more steam being applied. I think we were not running more than five miles an hour when the collision took place, about 8 o'clock as near as possible. I looked at my watch as I got out of my carriage after the collision had occurred. I have worked the branch trains for 22 years, and this is the first collision I have been in.

James Gilder, engineman about 18 years of Slough engine No. 463, states.—I worked the 6.22 p.m. from Moorgate Street to Windsor. All was right down to Slough, where we arrived at 7.58, and started again at 8.1 p.m. I saw nothing unusual until I had passed the coke stage, and had nearly reached the engine shed, when I saw a red light being waved in front. I shut off steam and tried to stop, also blowing the break whistle; but we were unable to stop until we had run into a break-van across the down line, and came to a stand. The trailing wheels of my engine were thrown off the road, and the life-guards, &c., bent and broken. Mine was a tank engine, 6-wheeled, we

were running with the chimney of the engine behind, so that the trailing wheels were in front. I think we might be running 12 or 13 miles when I first saw the red light. The break-van was a good deal damaged. I think I was running eight or nine miles an hour when we struck the break-van.

John Hunter, platelayer belonging to Slough, states.—At 5 p.m. on the 12th December I went out to Slough up Windsor branch distant-signal to relieve the day fogman, and I remained there up to and after the passing of the 7.35 p.m. up goods train from Windsor. The distant-signal was right for the previous train, but was at danger when the goods came up. I had two detonators down near the small hut, about 100 yards, or a little more, outside the distant-signal. The goods train ran over and exploded them, and passed me. The distant-signal remained at danger, and I therefore walked back further towards Windsor and put down three detonators about 200 yards nearer Windsor than the place where the goods had run over my detonators, and on the Windsor side of the large hut known as "Gammon's." I could just make out the red light from where I put down the three detonators. A few minutes after a passenger train ran over my detonators. I cannot say at what speed. I think the steam was on to the best of my recollection. I heard the driver blow his break whistle almost directly after, and a few moments later I heard the noise of one train running into the other. I cannot say whether any breaks were on as it passed me or not. I went back towards Windsor beyond the Chalvey road bridge, and then remained with detonators down until brought in, about 11 p.m.

From the preceding statements it appears that on the day in question the 7.35 p.m. up goods train from Windsor to Slough consisted of an engine and tender, 28 trucks (mostly empty), and a break-van at the tail of the train. It left Windsor at its appointed time, and stopped at the Slough up home-signal at 7.44 p.m., the driver having approached the station cautiously in consequence of the existence of fog, which had necessitated fogmen being employed outside the up distant-signal to indicate the state of the distant-signal to the drivers of the up trains. This goods train ran over and exploded two fog signals which were put on the rails opposite to a small hut outside the up distant-signal. The goods train remained in the same position until it had been run into by the 7.50 p.m. up passenger train from Windsor to Slough. The tail of the goods train stood 132 yards inside the up distant-signal when the collision occurred. The company's book of regulations do not require that, under such circumstances, when the tail of a train is standing between the distant and home signals, that the guard of the train should go back to protect it. Thus rule 219 states, "When trains are stopped between the home and distant signals, guards must not consider them protected by the distant-signal unless the engine is near to the home-signal," and, as already stated, the train stopped at the up home-signal. The 7.50 p.m. up passenger train from Windsor to Slough consisted of an engine and tender (running with the tender in front), 10 coaches, and one break-van, with two guards, and it left Windsor according to the guard at its appointed time, and according to the engine-driver (J. Tucker) at 7.54 p.m., or four minutes late. The engine-driver states that in passing a fogman's small hut, a short distance on the Windsor side of the up distant-signal (110 yards), the engine ran over two or three detonating signals, and just before doing so he saw a red light shown from the fogman's hand-lamp, that he shut off the steam on seeing the red light and as soon as he ran over the detonators he blew the brake whistle and the fireman at the same time applied the tender break. He admits that he passed the up distant-signal, which was on at danger, while running at a speed of from 15 to 20 miles an hour, but nearer 15 than 20; that when they had just passed through the over bridge he saw another red light ahead and heard a shout, and then he reversed his engine and again blew the break whistle, and he ran into the tail of the goods train, at a speed which could not have been more than five miles an hour, about 8.1 or 8.2 p.m.

The platelayer (Hunter) who was employed as fogman, distinctly states that he put down fog signals for the goods train opposite to the small hut used by the fogmen, a little more than 100 yards outside the distant-signal, but then he went further out towards Windsor, and placed the detonators for the 7.50 p.m. up passenger train from

Windsor, about 200 yards nearer to Windsor than the place where the goods train had run over the detonators, and on the Windsor side of the large hut known as Gammon's Hut, and from this spot he says he could just make out the red light from the distant-signal.

Gammon's Hut is 320 yards from the distant-signal, and thus, if the platelayer's evidence is to be depended on, as it seems to me that it should be, the driver of the 7.50 p.m. up passenger train received a warning to stop upwards of 460 yards from the break-van of the goods train into which he subsequently ran.

This first collision was, therefore, entirely due to the driver of the 7.50 p.m. up passenger train running at too high a rate of speed as he approached Slough station during a fog, and also to his not having, when he ran over the detonating signals, at once taken all the steps which were within his power to arrest the progress of his train. It should, however, be stated that this driver (J. Tucker) had only been working in charge of trains over this branch line into Windsor six or seven days altogether.

As soon as the collision between the 7.50 p.m. up passenger train from Windsor had taken place with the up goods train, about 8.1 or 8.2 p.m., the driver (Panter) of the goods train on seeing that the down branch line had been fouled by a truck, which had been detached from the goods train by the shock of the collision, ran towards Slough station for the purpose of stopping the 6.22 p.m. down passenger train from Moorgate Street station to Windsor and showed a red light towards it. The passenger train consisted of an engine and eight carriages, of which the first and last were fitted with breaks. The red light was seen by the driver of the 6.22 p.m. down passenger train, who did all in his power to stop, but the distance was too short and the 6.22 p.m. down passenger train ran into the break-van of the goods train at a speed estimated at eight or nine miles an hour, and the leading wheels of the engine (which was running with the chimney behind and coal bunker in front) were thrown off the rails and the life-guards were bent and broken.

If the two passenger trains had been fitted with continuous breaks, placed under the control of the engine-drivers, it is probable that the two collisions would not have occurred, and it may also be remarked that the first collision would not have taken place if the traffic on the branch line had been properly worked on the absolute block system so that line clear should not have been given while a goods train was standing between the home and distant signals.

The up distant-signal on this branch line should be removed to a greater distance from the home-signal, and an electric repeater be placed in the signal-box, to show its position, whether on or off.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 6th January.

HIGHLAND RAILWAY.

SIR,
Board of Trade, (Railway Department,)
13, Downing Street, London, S.W., December 20th, 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 10th instant, the result of my inquiry into the causes of an accident which occurred at Lentrane, on the Highland Railway, upon the 22nd of November.

In this case, as the 3.10 p.m. down passenger train from Inverness was entering the passing loop at Lentrane, at about 3.45 p.m., the engine, tender, and the six leading vehicles in the train left the rails, and the remainder of the train took the wrong road.

The train was made up as follows :—Engine, tender, luggage van, composite carriage, post office mail carriage, break-van, in which the breaksman was riding, third-class carriage, sleeping saloon, break-van, in which the guard was riding, composite, and six third-class carriages.

No passengers or servants of the Company were injured.

On the tender the tool box was stove in and one spring was broken, the front panels of the leading composite carriage were stove in, and the rear couplings of the luggage van were broken.

There was considerable damage to the permanent way. One rail was broken and 40 others had to be replaced, 143 sleepers, 130 chairs, two switch connecting rods, four pairs of fish plates, and a number of bolts were broken.

Description.

Lentran station is about $5\frac{3}{4}$ miles from Inverness, on the Highland Railway, which there runs from east to west.

The line, which was opened in 1860, is single, but there is at this station a passing loop 586 yards in length.

There is a distant-signal in either direction, the down distant-signal being 445 yards outside the east end of the loop.

The home-signals are two arms on one post situated on the station platform 343 yards inside the points at the east end, and 243 yards inside the points at the west end of the loop.

The home-signals are worked from the platform, and the distant-signals from a pointsman's hut at either end of the loop. There is no interlocking, and the facing-points are not provided with either locking-bars or bolts.

There is a good view of the down distant-signal from an approaching train for about 500 yards.

The line is level at this distant-signal, and up to a point 200 yards outside the east end of the loop, whence it is on a rising gradient of 1 in 100 up to the station platform.

The following rules in the Company's book of regulations bear upon this case:—

No. 76.—Junction signalmen, and other men in charge of points, will be held responsible for the good working condition of the same. The lever must be held firmly down whilst engines and trains are passing through *facing-points*.

No. 77.—The duties of the men attending to points are very simple and easily understood, but require great care and attention. Men in charge of points must therefore always be upon the alert, and cautious in the discharge of their duties. They must also try the points before the passing of a train, in order to be certain that there is no impediment to the working.

Where there are facing-points these precautions become doubly important.

Evidence.

James Reach, guard seven years, states.—On the 22nd of November I was guard of the 3.10 p.m. down passenger train from Inverness to Wick, consisting of engine and tender, close luggage van, composite carriage, post office mail carriage, break-van, in which the breaksman was riding, third-class carriage, sleeping saloon, rear break-van, in which I was riding, composite carriage, and six third-class carriages. We left Inverness at 3.27 p.m., 17 minutes late, and Burnchrew at 3.41 p.m., 20 minutes late. The signals were all right for running into Lentran, where we were timed to stop at 3.27 p.m. We arrived at the loop points at 3.45 p.m. We were then running at about 10 or 12 miles an hour. I was putting on my break as usual to pull up at the station when I felt a shock. I held on to the break and put it on harder until we came to a stop, in about 80 yards. I got out and found the engine and tender with all the wheels off in the 6-foot, the luggage van with all wheels off partly on the up loop, and partly in the 6-foot, the composite carriage in a similar position, the post office van, breaksman's van, and third-class carriage, with all wheels off on the up loop. The sleeping saloon with the front bogie off on the up loop. All the remainder of the vehicles were on the rails on the up loop, except the two rear carriages, which were outside the loop points. No vehicle was thrown over on its side, but the luggage van was slewed a good deal. I went at once and inquired if any passengers were hurt. No one made any complaint. I then went back and looked at the points, and found them lying right for the up loop. There were marks where the engine wheels had run

over the heel of the switches and the connecting-rod was broken. The points are worked by hand-lever on the ground, and there is no facing-point bolt or locking-bar. I spoke to the pointsman, who was at the lever, but I did not ask him how he had caused the accident. He was a little excited, but I do not think he was under the influence of liquor. I did not notice any smell of liquor on him. I heard no whistle for my breaks. We were not running any faster than usual, and would have pulled up easily at the station. The pointsman's box and the man himself up at the points are clearly visible half a mile off. I had my break working on my van only. The breaksman in the front van had a Fay's break on his van and one carriage.

Peter Hepburn, breaksman, states.—On the 22nd November I was riding in the front break-van of the 3.10 p.m. down train. The first thing I knew of anything being wrong on approaching Lentran was hearing the driver sound his whistle, about 30 or 40 yards before he got to the pointsman's box at the loop points. I put on my break at once. It was a Fay's break on my van and one carriage. I then looked out, and felt something jerking, and I saw the engine and tender running off the rails with the rear wheels in the 4-foot of the down loop, and the off wheels in the 6-foot. The six succeeding vehicles followed the up loop off the rails. I did not see the pointsman till I got out, when the train came to a stand, with the engine about 100 yards over the points. We were not running any faster than usual. No couplings

were broken. When I saw the pointsman afterwards he was quite sober. He asked me if anyone was hurt, and I told him I saw none. I asked him how it had happened and he said he did not know. I was sent back to pull up the special with the break-down gang. I afterwards asked the pointsman again how it had happened. He said he had lowered his signals and went into his box without setting his points right, and then he had sat down and fallen half asleep. He got up when the train was just at his box, but too late to put the points right. The whistle I heard was the ordinary whistle and not the break whistle. We were running from 15 to 20 miles an hour at the time, at least I should think so. I spoke to the driver afterwards, and he said he and his mate were not hurt. We did not speak about the points. I put my break on because it is not usual to whistle there, and I thought something was wrong.

Ralph Clark, driver 14 years on Highland Railway and eight years on North British, states.—I was driver of the 3.10 p.m. down passenger train on the 22nd November. Everything was right until we got to the loop points at Lentrán. The down distant and home signals were both off, and I was running at my usual speed of from 40 to 45 miles an hour up to the point where we always shut off steam, about half a mile from the loop. The break was applied as usual about the distant-signal, and my speed was reduced to about 15 or 18 miles an hour. When I had come to within 20 yards of the points, I saw that they were half set. I reversed my engine, and my mate put on the tender break hard. I had whistled when about half-way from the distant-signal, because the pointsman was not at his lever. He came out just after I had seen that the points were half set, and he had just got his hand to the point-lever when my engine wheels struck the end of the points and we got astride and ran off. We ran about 100 yards. When the pointsman came forward afterwards he asked if anyone was hurt, and I said "No." Nothing more passed between us. I was a little late, but was not running any faster than usual in order to make up time. I could have pulled up easily at the station. On a clear day I can see the pointsman a long way off. It was rather a dull foggy evening. I did not observe that the pointsman was not at his post until just after I had passed the distant-signal. I sounded my whistle when about 200 yards from the points. I did not sound sooner because the man usually comes out when I am about 200 yards off. I know that he should not leave his lever when his signals are off, but I thought he would come out as usual. There is no rule that I am to pull up if the man is not at his lever. My engine is a 4-wheel coupled bogie engine. There are no break blocks in the engine wheels.

There is a hand-break in the tender with one wooden break block on each of the six wheels.

William Farquhar, formerly pointsman at Lentrán, states.—I was in the service of the Highland Railway for 18 years, and had been two years at Lentrán when the accident occurred on the 22nd of November; on that day I came on duty at 5 a.m. My duties were to attend to the points at both ends of the loop, and to do other outside work at the station, where I was the only man employed under the station-master. On the day of the accident I had been working the points at both ends of the loop from 5 a.m. till 3 p.m., with half an hour's interval for dinner. My daily tour of duty was from 5 a.m. till 8 p.m. An up goods passed at about 1.32 p.m., and the next train either way was the 3.10 p.m. down passenger train. I was not at the east or up end of the loop when the goods passed, as I had to be at the other end to hold the facing-points for it to come in. At the time of the accident the points at the east end were weighted to lie for the up road, but the lever could be fastened over for the down road. They have since been altered, and a lever has been fitted with weight to lie either way. I was at the station at about 3.15 p.m. and lowered the down home-signal as usual for the 3.10 train, and then went down to the east end of the loop, and lowered the down distant-signal, which is worked from the hut by these points. This was about a quarter of an hour before the accident. I did not set the points for the down road, but left them just as they had been lying for the up goods to pass. I then went into my hut and sat down. I cannot say whether or not I fell asleep, but I never observed the train until it was within a few yards of the points. I ran out and put my hand on the lever but the engine was over the points. I held the lever for the remainder of the train to pass. The engine had got off the rails, and the whole of the train took the wrong road. I did not try to alter the points as the engine was on them. I had not oiled the points that morning as they did not require it. I am certain they were in good working order and that they were lying quite right against the stock-rail when I came to them. I know that there is a rule that the points should be tried before a train comes. I did not do so.

Alexander Cockburn, station-master at Lentrán, states.—Lentrán is not a regular crossing place. Since it has ceased to be so there has been only one man for all the work under me from 5 a.m. till 8 p.m. He has also occasional night duties, but for special trains only. The late pointsman never made any complaint of the hours of work. There are five regular daily trains each way.

Conclusion.

From the foregoing evidence it appears that the pointsman at Lentrán, having taken the signals off for the 3.10 p.m. down train from Inverness, omitted to set the facing-points in their proper position for the down loop, and that the engine, running at the time about 15 miles an hour, struck the end of the right-hand point-rail, which was not properly closed to the stock-rail, and getting astride of the switches ran off into the 6-foot way, followed by the tender, and the six leading vehicles of the train. When the engine came to a stand, 144 yards inside the points, these six vehicles were off the rails, partly in the 6-foot way and partly on the up loop, the rear bogie of the sixth vehicle, a sleeping saloon, and all the remainder of the train being on the rails on the up loop, except the two rear third-class carriages, which were on the line outside the loop points.

It is probable that the points, which were weighted to lie right for the up loop, had been shaken partly open by the goods train which had passed over them in a trailing direction about two hours previously, and that when the pointsman came down to them he failed to notice that they were half set.

This accident was therefore due to neglect of duty on the part of the pointsman, who omitted to obey the Company's rules directing that all points must be tried before

the passing of a train, and that "the lever must be held firmly down whilst engines and trains are passing through facing-points."

The man in fault, who has since been dismissed from the service of the Company, does not attempt to excuse himself, but states that, feeling tired, he sat down in his hut after taking off the distant-signal and forgot all about the train, probably being half asleep, and when the duration of his daily tour of duty is remembered, it is not surprising that sooner or later this should have happened.

It must also be remarked that an accident of this description cannot well occur where the proper appliances according to present requirements are provided, that is, where the points and signals are interlocked, and all facing-points are fitted with locking-bars, facing-point bolts, and gauge ties.

It is most desirable that the arrangements at all stations should be altered to meet these requirements as soon as it is possible to do so, and in the mean time the Company should at any rate at once provide proper locking-bars and bolts for the facing-points at the ends of this loop, the levers working which should be interlocked with the existing distant-signal levers.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on the 21st January.

HIGHLAND RAILWAY.

SIR, Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 18th December 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 5th instant, the result of my inquiry into the causes of an accident which occurred on the 27th of November, near Blair Athole station, on the Highland Railway.

In this case, as the up mixed train, which left Inverness at 10 p.m. on the 26th November, was approaching Blair Athole station, at about 5.12 a.m. on the 27th November, the fourth goods waggon from the front left the rails, and was followed by 21 others, the engine and three leading waggons running ahead.

The train was made up as follows: engine and tender, two empty goods waggons, one empty van, 27 goods waggons, of which four were loaded, goods break-van, in which a breaksman was riding, luggage-van, sleeping saloon, third-class carriage, and rear break-van, in which the guard was riding.

No passengers were injured, and none of the passenger carriages left the rails.

Three goods waggons were totally wrecked, five were knocked off their wheels and much broken, and fifteen others were damaged, some considerably so.

The only damage to the passenger vehicles was the breaking of three bogie guides in the sleeping saloon.

About 90 feet of the permanent way was knocked away, and some sleepers and chairs damaged elsewhere.

The following new material has been required to make good the permanent way: 8 rails, 36 sleepers, eight pair of fish-plates and bolts, and 92 chairs.

Description.

The scene of this accident was about five furlongs north of Blair Athole station.

Coming from the North the line is quite straight for more than a mile, up to a point about 200 yards north of the spot where the first traces of the accident were found, and is then on a curve of 84 chains radius to the east for about 300 yards.

The line falls from beyond Struan station, about $4\frac{1}{2}$ miles north of Blair Athole; the gradient, which is 1 in 80 for about $1\frac{1}{2}$ miles, changing to 1 in 500 about 400 yards north of the break-down.

The line is single, and this portion of it was opened in 1868.

The permanent way, which has at this point not been relaid since that date, consists of a 75-lb. double-headed iron rail, fished with plates weighing 20 lb. per pair, laid in 22-lb. chairs, fixed by two spikes for each chair to larch sleepers $9' \times 9" \times 4\frac{1}{2}"$, or $9' \times 10" \times 5"$.

Evidence.

William Shepherd, driver seven years, states:—On the 26th November I was driver of the 10 p.m. up mixed train from Inverness to Perth, consisting of engine and tender, running engine first, 27 goods waggons, of which four were loaded, guard's-van, luggage-van, 3rd-class carriage, sleeping saloon, and guard's-van in rear. We left Struan at 5.3 a.m. on the 27th, right time, and had been running right all through. I shut off steam in the usual place, about two miles outside Blair Athole, and was running my usual speed. Soon after coming in sight of the Blair Athole up distant-signal I felt a slight blow at the rear of the tender. I could not see what had caused it, but I applied steam because I thought something was wrong, and I wanted to get on out of the way. The blow felt as if something had run into us from behind. There was no jerk before the blow. I was sitting down at the time, looking forwards, and was knocked backwards. I don't think the train had broken in two, because I had been watching the lights of the train all down the incline, and they did not seem to change their position. I hadn't checked or increased my speed suddenly. It was a clear frosty night. My tender break was slightly on at the time, easing down for the stop at the station, and my mate took it off. I ran on for about 200 yards and then stopped. I found there were only three vehicles left attached. I went and looked at the couplings, but can't say how they were. I found that the rear vehicle of the three, a closed van, had lost its trailing wheels, and that the panels at the rear were smashed. The front wheels of this van, and all the wheels of engine and tender, and the two other vehicles were on the rails. The breaksman came forward and told us that the road was blocked, and I went back. I found that a good many of the trucks were off the rails on both sides, and piled up in a heap. None of the passenger carriages were off the rails. I had been running my usual speed, and quite steadily. I had not felt anything wrong with the road. I did not go back to examine it.

James Stables, fireman three years, states:—I have heard the driver's evidence, and it is correct. I had put on the break about a mile before I felt the blow behind. The coupling at the rear of the closed van was broken, but I can't say in what manner.

John Mackay, guard seven years, states:—On the 26th November I was guard of the 10 p.m. up mixed train from Inverness. The train was made up as follows:—engine and tender, two empty goods waggons, empty closed van, 27 trucks, of which four were loaded, goods break-van, in which the breaksman was riding, luggage-van, sleeping saloon, third-class carriage, and rear break-van, in which I was riding. We were running about 10 minutes late. We left Struan at 5.1 a.m., 11 minutes late. We were next timed to stop at Blair Athole at 5.5 a.m. We were not making up time, but were running our usual speed. The train was running quite steadily, and I felt no jerk at all. The first I knew of anything being wrong was being knocked down in my van. I got out as soon as I could, and asked the passengers if they were hurt. There were about 20 passengers, and none of them complained. None of the passenger carriages were off the rails. When I got to the front of the train I found 22 of the waggons all off the rails, and piled up in a heap, smashed up. This was at 5.12 p.m., and about 400 yards outside the Blair Athole up distant-signal. The engine, tender, and the three leading vehicles were on the rails about 200 yards ahead. I didn't examine the road. The closed van, which was the last vehicle of those remaining attached to the engine, was without the trailing wheels, axle-boxes, and springs, and smashed in behind. The coupling was broken off; I cannot say if the draw-bar was broken. There was a portion of a truck in this closed van; I think it was the side, but am not sure. There

was no sudden acceleration of speed or jerk, that I could feel. My break was on about 300 yards before entering the wood, that is about 600 yards before the site of the accident. There were side chains to the closed van, but I don't think they were coupled. We were running about 18 miles an hour at the time. The signals were off for us to run into the station. I haven't felt anything wrong with the road before or since. I didn't think that the train had broken in half, for I had been watching the engine side light down the incline, and it didn't seem to leave us at all. There were seven vehicles in front of the leading passenger carriage, which were remaining on the rails.

John McLennan, breaksman three years, states:—On the 26th November I was acting as breaksman to the 10 p.m. up mixed train from Inverness, and was riding in the break-van between the goods waggons and the passenger carriages. We came at about our usual speed from Struan. The first I knew of anything being wrong was from being knocked over in my van, when we were approaching Blair Athole, running about 18 miles an hour. When I got up, I found that the train had come to a stand, and I got out. We were about 300 yards outside the up distant-signal at Blair Athole, and I found about 22 of the waggons off the rails, and piled up in a heap on both sides and in the middle. The engine and three leading waggons were standing about 200 yards ahead. I went forward to look at them, and found that the closed van, the rear vehicle of the three, was without its trailing wheels. I can't say what was the state of the couplings. There was the piece of another truck inside the closed van. My break had been applied when the driver shut off steam, and it was still on at the time of the accident. I felt no sudden jerk before the accident, and no sudden checking of the speed. The road seemed to be running smoothly. I hadn't much time to look about, for I was sent off with the engine and two leading waggons to telegraph from Blair Athole for assistance. I don't think the train had divided, because I had been looking out all down the bank, and had seen the engine light. I was just looking out at the time of the accident, and the engine light was the right distance ahead. When I came back from the engine I found, opposite to the rear break-van where it was then standing, two axle-boxes and springs. The boxes were marked C. R.

John Smith, inspector of permanent way, states:—I have charge of 44 miles from Stanley junction to Dalnaspeidle. I had been over the road at the site of the accident every day for a fortnight preceding the 26th November, as I was working just above. I gauged the road up to the place where the accident occurred, and found it pretty regular, but about one-eighth of an inch tight for about 50 yards on both sides of this place. The line here has not been relaid since it was made in 1863, but there have been several new sleepers and chairs put in. The cant is about three inches, and is even. I consider the road was in good order. I got there at about 9 a.m., and made a careful examination, but could find nothing wrong, and no obstruction to account for the accident. The first mark of any kind was a piece out of a sleeper between the rails, about 50 yards north of the place where the trucks were piled up, as if it had been scooped out. There was no mark of a wheel running over the top of the rails, but marks along the tops of the sleepers, about one foot inside each rail. About 90 feet of the road was knocked away; and the following new material has been used to make good the damages: four pair of rails, 36 sleepers, eight pair of fish-plates and bolts, and 92 chairs. The waggons were piled up in a heap, principally between the rails. Beyond the heap of waggons there were marks along the sleepers where the trailing end of the closed van had been dragged.

Mr. Kennedy, inspector, states :— I was on the ground at 2.30 p.m. on the 27th. I examined the road carefully. There were marks on the sleepers in the four-foot way, commencing 30 or 40 yards back from the heap of wrecked waggons. These marks ran parallel to the rails, about one foot inside each rail. They were on nearly all of the sleepers, but missed a few. The mark on the right side looked as if it had been caused by a wheel being scraped along sideways. The first mark was a large scoop out of a sleeper. There was no mark on the rails there. The

draw-bar of the closed van was broken and drawn out, and the trailing wheels, axle, axle-trees, and springs were all off. I can't say for certain where they were, but two springs, not a pair, and two axle-boxes marked C. R. were found some way back, a few yards further from the heap of waggons than the position of the first mark on the sleepers. I saw the broken journal. I think it was among the débris, and don't know where it was picked up. The axle belonging to it was lying near to the front of heap of débris.

Conclusion.

The evidence of the driver in this case, in regard to the shock which he felt at the back of the engine, would rather point to the possibility of this accident having been caused by the train breaking into two, and by the rear overrunning the front portion; but this view is contradicted by the evidence of both the guards and of the driver himself, as to the relative position of the lights on the engine and the train.

There is no trace of any wheels having run off over the rails before the accident occurred; the speed of the train does not seem to have been excessive; nor, according to the evidence, was there any sudden alteration of speed at the change of the gradient.

It appears that the third vehicle from the engine, a closed van belonging to the Caledonian Railway Company, lost its trailing wheels, axle-boxes, and springs, and was, after the accident occurred, dragged for about 200 yards in this condition, being still coupled to the waggon in front, while part of the side or end of another waggon being found inside it shows that it had been mounted by the waggon behind it.

This waggon, also belonging to the Caledonian Railway Company, had the journal of the axle on the left side broken off, and was found much damaged among the heap of the 22 waggons which left the rails.

It seems clear that the accident was due to the break-down of one or other of these two vehicles, and as there is no sign of any old flaw in the broken journal, it may very well have been broken by the accident; while, on the other hand, the two springs and axle-boxes, picked up some 30 or 40 yards behind the heap of waggons, may very possibly have belonged to the closed van, although not identified at the time, and prove conclusively that some vehicle, at any rate, was damaged before the final break-down took place.

Judging from these facts, and from the marks on the sleepers, I am of opinion that from some cause the closed van lost its trailing springs and axle boxes, that the trailing pair of wheels then got loose, and were dragged along under the bed of the van for some distance, and that the trailing end, dropping on to the ground, was mounted by the fourth waggon, which then left the rails altogether, followed by those behind it, the engine, two leading waggons, and the crippled van breaking off and running ahead.

This accident therefore furnishes another proof of the risk to which passengers are exposed by the running of mixed trains, especially when they are made up with the goods waggons in front; and it is fortunate that in this instance the break-down occurred at the front of the train, and not to one of the waggons near to the passenger carriages, or the consequences would probably have been more serious.

In conclusion, although I do not attribute this accident to the state of the permanent way, yet I cannot too strongly urge upon the company the necessity of relaying this portion of the line with as little delay as possible, for the rails are very much worn and reduced in weight, with parts showing a ragged working face, and are in places quite unfit for the passage of heavy traffic at anything more than a low rate of speed.

I have, &c.,

The Secretary,
Railway Department, Board of Trade.

F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Highland Railway Company on the 21st January, and to the Caledonian Railway Company on the 24th January.

LEEDS JOINT STATION.

Board of Trade, (Railway Department),
13, Downing Street, London, S.W.,

SIR,

27th January 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the Order of the 30th November last, the result of my inquiry into the circumstances connected with the collision which occurred on the 20th November last, at Leeds new station, between a North-Eastern Company's passenger train and a London and North-Western Company's engine attached to some empty coaches.

In this case, as the 6.10 p.m. North-Eastern Company's passenger train from Ilkley, due at Leeds at 7.5 p.m., and consisting of a tank engine (running tank first) and seven vehicles, with a break-carriage at each end of the train, was running into the station, it came into collision with a North-Western Company's engine attached to five empty coaches, which were to form part of the 8.15 p.m. train to Manchester.

No passengers were injured.

The guard of the North-Eastern Company's passenger train and the driver of the London and North-Western Company's engine were injured.

The buffers of both engines were damaged. No wheels were thrown off the rails.

Description.

This collision occurred between the canal cabin at the western entrance to the Leeds new station and the west cabin (near to the west end of the platforms), about 300 yards from it. The signalmen in these cabins mutually control each other's home-signals, the distant-signal for the west cabin being the home-signal at the canal cabin, and vice versa. The signalman at the west cabin also worked a stop-signal applying to incoming trains, situated about 160 yards to the west of his cabin, the home-signal applying to line No. 3, on which line the North-Eastern Company's train was coming in, being about 80 yards nearer the cabin. The crossing between Nos. 1 and 3 lines, on which crossing the collision occurred, was interlocked with the home-signal for No. 3 line, but not with the stop-signal.

The traffic through the station is not worked on the block system, but the signalmen inform each other of the nature of approaching trains by means of telegraphic signals. At the time of the collision the alterations in the arrangements of the signals and lines, which were fully brought into use on the 5th January last, were in progress, and when I made my inquiry the state of things which had existed at the time of the collision had been entirely altered.

Evidence.

1. *John Cottingham*, driver in the London and North-Western Company's service since 1861.—I had brought in the train from Manchester due at Leeds at 6.15 p.m., and was engaged in making up the 8.15 p.m. passenger train for Manchester. After making one shunt I had taken hold of five coaches of the empty train, and was waiting ready to take these out to the back of the ticket platform, when I received a hand-signal from the signalman in the west cabin to draw ahead, and he also said "Come ahead, North-Western." I was driving a tank-engine, which was now chimney first, and on drawing ahead found that I was being turned on to the main line (No. 3) instead of, as I had thought I should have been, on to No. 2 line at the back of the ticket platform, and I was on the crossing leading to No. 3 when I met the engine of the Ilkley train. Neither I nor the fireman had seen this train till it was close to us. I had only time to shut off steam and reverse before the other engine struck mine. We were in forward motion at a speed of about two miles an hour when we struck. We neither of us jumped off. I was knocked against the front of the fire-box and injured in the shoulder. A shunter who was standing near the cabin called me on, as well as the signalman.

I was standing on the right-hand side of the engine before we drew out with the empty coaches. Before going ahead the shunter, who was standing by the foot-plate, said we were to go on to No. 2 road, and the signalman said "Come ahead," but we found, after passing through the points, that we were going on to No. 3 road. I at the same time saw the North-Eastern train approaching us. I had just time to get my break on, and my driver to reverse, when the engine met about the middle of the crossing. I was not hurt. We were about 30 or 40 yards from the points when we started with the coaches. The shunter shouted at the same time that we saw the North-Eastern train. The night was at this time rather foggy, but not very thick. I had seen no light engine pass along the No. 3 line just before.

3. *Robert Clarke*, signalman eight years in the service of the Leeds Joint Station Committee, four years in the west cabin.—I came on duty at 2. p.m. on the 20th November for eight hours. A London and North-Western Company's signalman named Scott was with me at the time, learning the duties of signalman. At about 7.35 or 7.40 p.m. I received a bell signal (two beats) for a North-Eastern passenger train, and concluded it was the Ilkley train due at 7.5; the trains having been detained owing to fog, which had cleared considerably at this time. I lowered both distant, home, and stop signal. On the

2. *Joseph Nichols*, fireman 3½ years in the service of the London and North-Western Railway Company.—

engine of the supposed train coming in sight, I found it was a light engine which passed on through the station, with the signals which I had off for it. I had passed on the bell-signal to the station cabin as a train, and I gave no error signal to the station cabin on finding it was a light engine. I put my distant-signal up very soon after the engine had passed, and rang a small key bell once into the station to inform them that a North-Eastern passenger train was coming in. I put my home-signal up as soon as the engine had passed it, or perhaps the station signalman might have put his slot on first. Two or three minutes after this, during which time no other signal had been given from canal cabin, I opened the points to allow the London and North-Western engine to proceed from No. 1 to No. 3 line, using a hand lamp for the purpose, and I also shouted to the driver. I should have turned the engine along No. 2 road, but thought there was no room, as there were already some empty coaches standing in No. 2. I saw nothing of the Ilkley train approaching, until I heard the shunter shout, and then on looking I saw it in collision with the London and North-Western engine on the crossing. The home-signal for No. 3 line had certainly been on two or three minutes before the collision. The light engine could not have got on to No. 3 line without the permission of the canal cabin signalman, who ought to have signalled it on to me. Some ten minutes before this the canal cabin signalman had signalled the light engine on, which had passed; and this signal I had acknowledged. I had put the stop-signal to danger directly after the distant-signal. This stop-signal was about 160 yards on the canal side of the cabin, and 80 yards from the home-signal and on the canal side of it. I am confident that the stop-signal was not interlocked with the crossing from No. 1 to No. 3. I deny having received two consecutive signals for light engines from canal cabin.

4. *Donald Foster Scott*, relief signalman in the London and North-Western Company's service, and at the time of the collision learning the duties of signalman in the west cabin, with a view of taking temporary duty during the alterations at the station.—There had been no signal from canal cabin for at least a quarter of an hour previously to that for the North-Eastern passenger train, viz., two strokes. Clarke passed it on to the station cabin signalman, who pulled the slot off the home-signal, and Clarke then lowered the home and stop signal, but I am not sure whether or not he pulled the distant-signal off. An engine then came up instead of (as we had expected) the passenger train. Clarke put on his signals directly the engine had passed and made the remark, "The train has turned out to be an engine." Before Clarke was aware it was not the Ilkley train he had rung it forward to the station cabin. Two or three minutes after the light engine had passed Clarke allowed the London and North-Western engine to come out on to No. 3 line, and I had not seen anything of the Ilkley train till I saw the engines in collision on the crossing. I heard the shunter shout a second before the collision. I did not ask the North-Eastern driver how he came to pass the signals at danger. There were no wheels off the rails.

5. *Joseph Neal*, signalman $5\frac{1}{2}$ years, all the time in the canal cabin.—I came on duty at 2 p.m. for eight hours. At about 7.35 p.m. I had signalled on a light engine with five strokes to west cabin, and got the signal acknowledged. It was standing some time after this at the home-signal (the road being

occupied by an outgoing London and North-Western train and two other engines), and then proceeded towards the west cabin about 10 minutes after it had been signalled, and remained standing at the stop-signal for No. 3 line working from the west cabin. On seeing the stop-signal lowered and the engine go away I signalled the Ilkley train, which had all but come to a stand on the canal bridge, to the west cabin signalman, who gave back two bells. I went to the window and said to the driver "Draw ahead." He went past my cabin, but whether my signal was off or not I cannot say. I noticed that the stop-signal was off before the collision, when the tail of the train was at my cabin, but I did not observe the west cabin home-signal.

6. *John Schofield*, driver in the service of the North-Eastern Company 20 years.—I was in charge of the 6.10 p.m. from Ilkley, which consisted of a tank engine, running tank first, and seven vehicles. We started about 35 minutes late, having been detained by fog. We were stopped at the canal box, and called forward by word of mouth without the home-signal being lowered. I drew past the cabin, and as I did so, both the stop and home signals worked from the west cabin were taken off. I saw nothing in front of us, but the canal signalman said that an engine had gone forward about 10 minutes before. I then went forward, and passed the stop-signal at all right. I then lost sight of the home-signal, and on getting to the points found them open for No. 1 line and the North-Western engine coming towards us. I had shut off steam at the stop-signal, and had just time to reverse and get steam against my engine when we came into collision, my speed being three or four miles an hour. We neither of us jumped off. No wheels were off the rails and no damage done. We stopped dead at the canal cabin about two minutes.

6. *William Clapham*, fireman in the service of the North-Eastern Company six years.—We stopped dead at canal cabin about two minutes, and we were then called forward by the signalman and told to go on to the stop-signal. I observed nothing standing at this signal, which was at danger when we passed the canal cabin, but was taken off as we approached it. It remained off till we passed it, as did also the home-signal, which remained off till I had lost sight of it on passing under the new bridge. We then found ourselves turned through the crossing. I had just time to get my break hard on and the driver to reverse the engine and give it steam. The speed was very slow when we struck. I was not hurt.

7. *William Hudson*, guard five years.—I left Ilkley with the 6.10 p.m. train for Leeds at 6.41 p.m., the detention having been caused by late arrival due to fog. The train consisted of a break-carriage at each end of the train and five vehicles, seven in all. We had a clear run in till we came to the canal box, where we stopped two minutes by signal. The signalman called the driver past, and just by the cabin I saw the stop and home signals at the west cabin taken off. I saw that they remained off till the engine had passed the stop-signal, when I came inside and booked the time we had lost, and before I had done this the collision had occurred and my head was knocked through the window in the van. I was knocked down, and was laid up for about a month. I booked the time as being 7.40. The speed at the time of the collision was three or four miles an hour.

Conclusion.

This collision, in which a North-Eastern Company's passenger train from Ilkley and a portion of a London and North-Western Company's empty train came together on a crossing between two of the main lines close to the station, was brought about by the signalman in the west cabin having forgotten the fact that a light engine was

standing on No. 3 line at a stop-signal about 160 yards from his cabin. Upon receiving an announcement from the canal cabin of the approach of the Ilkley train on No. 3 line he lowered his signals, and then to his surprise found that it was a light engine (and not the passenger train) which had come up and passed his cabin. He, however, merely thinking that the canal cabin signalman had sent on a wrong signal, opened the points of the crossing leading from No. 1 line (on which the London and North-Western engine and carriages were standing) to No. 3 line, to allow the North-Western driver to make a shunt, which there was not room for him to make on No. 2 line. Before opening this crossing he had probably neglected to put the stop-signal (which it appears was not interlocked with the points) to danger, for the North-Eastern driver, fireman, and guard all state positively that it was off until the engine had passed it.

As the arrangements of the station have now been completely altered no similar collision can recur.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, Whitehall, London, S.W., 30th November 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 15th instant, the result of my inquiry into the circumstances connected with the accident which occurred on the 14th instant to the 7.15 a.m. down passenger train from Euston station to Carlisle, a short distance north of Wigan station, on the North Union section of the London and North-Western Railway.

One passenger has complained of having been injured on this occasion, but the circumstance was not known to the Officers of the Company at the time of the accident; the driver and fireman of the engine were also hurt, the former somewhat severely, as he has not yet been enabled to return to his work.

No damage was done to any of the vehicles in the train except the engine, and the particulars of the damage to the engine are given in Appendix A.

Some damage was done to the permanent-way by the train running off the rails for about 100 yards, by the displacement of five lengths of rails, three of which were torn out and bent, and one was broken; and 23 chairs were also broken, and 25 sleepers damaged.

Evidence.

William Oakes, engine-driver 20 years, and 27 years in the Company's service, states:—I was driving the "Champion" engine, No. 2147, of the 11.11 a.m. down passenger train from Crewe to Carlisle on the 14th November, which consisted of an engine and tender and five vehicles. All went right as far as Wigan, where I was not appointed to stop; and as we passed through the station we ran over a fog-signal, and a man showed us a green flag. This was just before we reached an under-bridge on the line, which was under repair. We were running about 40 miles an hour when we ran over the fog-signal. I shut off the steam at once, and the fireman put on the tender-break, and we reduced the speed so that when we passed over the bridge, which was under repair, I think we were not going more than 20 miles an hour,—not so much as that. After passing over the bridge I turned on the steam again, and the speed had increased, when I suddenly felt a break or jar, and this was succeeded by a second jar before the engine got off the rails. There was no time to do anything but to shut off the steam and to close the fire-hole door. The fireman pulled the string for the continuous breaks, but I cannot say whether they

went on or not. I think we were running from 30 to 35 miles an hour when I felt the first jar. The leading wheels of the engine were still on the rails when the engine stopped; all the other wheels of the engine, and the tender and the other vehicles in the train, all got off the rails on the 6-feet side, and fouled the up main line. After the train had stopped I got off the engine, and when I saw that the up line was fouled by the carriages, I ran and walked ahead to the signal-box at Rylands siding, a full quarter of a mile ahead, and told the signalman there not to allow anything to pass on the up line, as it was blocked. This occurred about 6 minutes past 12 o'clock. There was an up passenger train from Carlisle due at Wigan at 12.5. I heard this up train coming before I got to the signal-box. That up train was stopped at the Rylands siding signals. I was hurt in the knee, and am not yet able to return to my work, but I do not know how I was hurt.

Peter Smallwood, fireman 15 years in the Company's service, states:—I was acting as fireman to William Oakes, driver of the 11.11 a.m. down passenger train from Crewe to Carlisle, on the 14th November. The

train was not appointed to stop at Wigan; but as we passed the north end of the station, a flagman showed us a green flag, and my driver shut off the steam, and had reduced the speed to between 20 and 30 miles an hour, when suddenly, and without any previous notice, the crank-axle of the engine broke, and the engine was thrown off the rails, except the leading wheels, which still remained on the rails. I was struck on the head, and thrown into the tender, and my mate was badly hurt in one leg. I do not know whether he had time to do anything. I had hold of the cord to put on the breaks, but I do not know whether I put them on or not. I was confused, but not insensible. I do not know what it was that hit me. We had again put on steam, after slackening speed, when the crank-axle broke, and we were then running about 30 miles an hour with the steam on. This occurred about 5 minutes past 12 o'clock. The whole of the train was thrown off the rails.

Thomas Houghton, inspector of permanent-way 19 years, states:—I got to the spot with the break-down gang about 1 p.m., and found the whole train off the rails, with the exception of the leading wheels of the engine, nearly three-quarters of a mile north of Wigan station. The inside rail of the down line, on which the train was running—that next the 6-foot—had five lengths of 21-foot rails displaced, three were completely torn out, and one rail was broken; the broken one was the farthest from the station. I think there were 23 chains broken, and about 20 sleepers damaged. The road was in good order. All the carriages were foul of the up line. The gradient is 1 in 330 from Rylands bridge, rising northwards. At that part the line is quite straight. The first indication of anything being wrong with the train was the finding of a piece of a cylinder cover, 70 yards before any wheel left the rails; and from the place where a wheel first got off the rails to where it came to a stand was 100 yards. The train consisted of an engine and tender and five vehicles, including a dummy post-office tender, two composite carriages, and one break-van at the tail of the train, with Clark and Webb's continuous breaks throughout the train worked both from the engine and from the guard's van.

F. W. Webb, Mechanical Engineer and Locomotive Superintendent of the London and North-Western

Railway Company, states:—I have examined engine 2147 (Champion) since the accident north of Wigan, the primary cause of which was supposed to have been the breakage of the crank-axle; but upon a careful examination of the engine, I have no doubt that the first cause of failure was the breaking of one of the gudgeons of the right-hand crosshead, which was made of iron (a sketch of which I enclose here with), causing the small end of the connecting-rod to be liberated, and allowing the end of the connecting-rod to strike against the end of the piston-rod in the first instance, and knocking out the cylinder cover; it then struck the spectacle-plate and partially doubled up the small end of the rod (as shown in the accompanying diagram). The damage was then still further increased by the end of the liberated rod striking the sleepers, causing the connecting-rod to break, as shown. The end of the connecting-rod left attached to the crank-axle was then forced through the outer and inner casings of the fire-box, just above the solid foundation-ring, which was also considerably bent by the force of the blow. The effect then was to break the crank-axle in the manner shown in the accompanying sketch. The part which is wanting where the connecting-rod broke, I have no doubt, was broken away when the rod drove through the steel boiler-shell. The fractured end A. shows, by being upset, the very great strain that was put upon it. There was no previous flaw of any kind in the axle, and the fracture shows the metal to have been extremely good. From the peculiar way in which the fracture took place, the wheel was forced out outwards, and after bending the frame somewhat considerably, and finally breaking it, it gave way, causing the driving-wheel to burst the road and throwing the train off the line; the leading wheels of the engine, however, still remained on the road. For some considerable time the crossheads, similar to the one which has failed, have been made in steel, and a large proportion of our stock is now so fitted. The engine was built in 1874, and since first starting has run 169,789 miles. She is a 5' 6" 4-wheel coupled passenger engine, inside cylinder 17" + 24" stroke, and was last in the shop for repairs in January (being turned out again in April), when there was no flaw apparent in the crosshead. The repairs then done to her were as per enclosed memorandum.

Conclusion.

From the preceding statements, and from information obtained on the spot, it appears that the 7.15 a.m. down passenger train from Euston station to Carlisle, while running at from 30 to 35 miles an hour on a gradient of one in 330,—rather more than three-quarters of a mile north of Wigan station,—suddenly all got off the rails on the 6-foot side, with the exception of the leading wheels of the engine, and after running about 100 yards off the rails the train was stopped with the engine 370 yards south of Rylands siding signal-box.

This train consisted of an engine and tender and five vehicles, including a guard's break-van, placed at the tail of the train, which was fitted throughout with Clark and Webb's continuous breaks.

The first indication which could be traced, on search being made of anything being wrong with this train, was the finding of a portion of one of the cylinder covers 10 yards north of Rylands under-bridge, and 70 yards south of the spot where the first wheels of any vehicle got off the rails.

The line at this part is straight and on an embankment, and fortunately the train got off the rails on the east or 6-foot side, although in doing so it fouled the up main line.

This down passenger train was appointed to run through Wigan station without stopping, and according to the service time-tables it was due to pass at 12.5 p.m., and was apparently running according to its proper time, as the train was brought to a stand at 12.6 p.m.

The 8.45 a.m. up passenger train from Carlisle to London was due to arrive at Wigan at 12.5 p.m., and to leave at 12.8. Fortunately it was not quite punctual that morning, or a very terrible collision might have ensued between the 7.15 a.m. down

Nº 1.

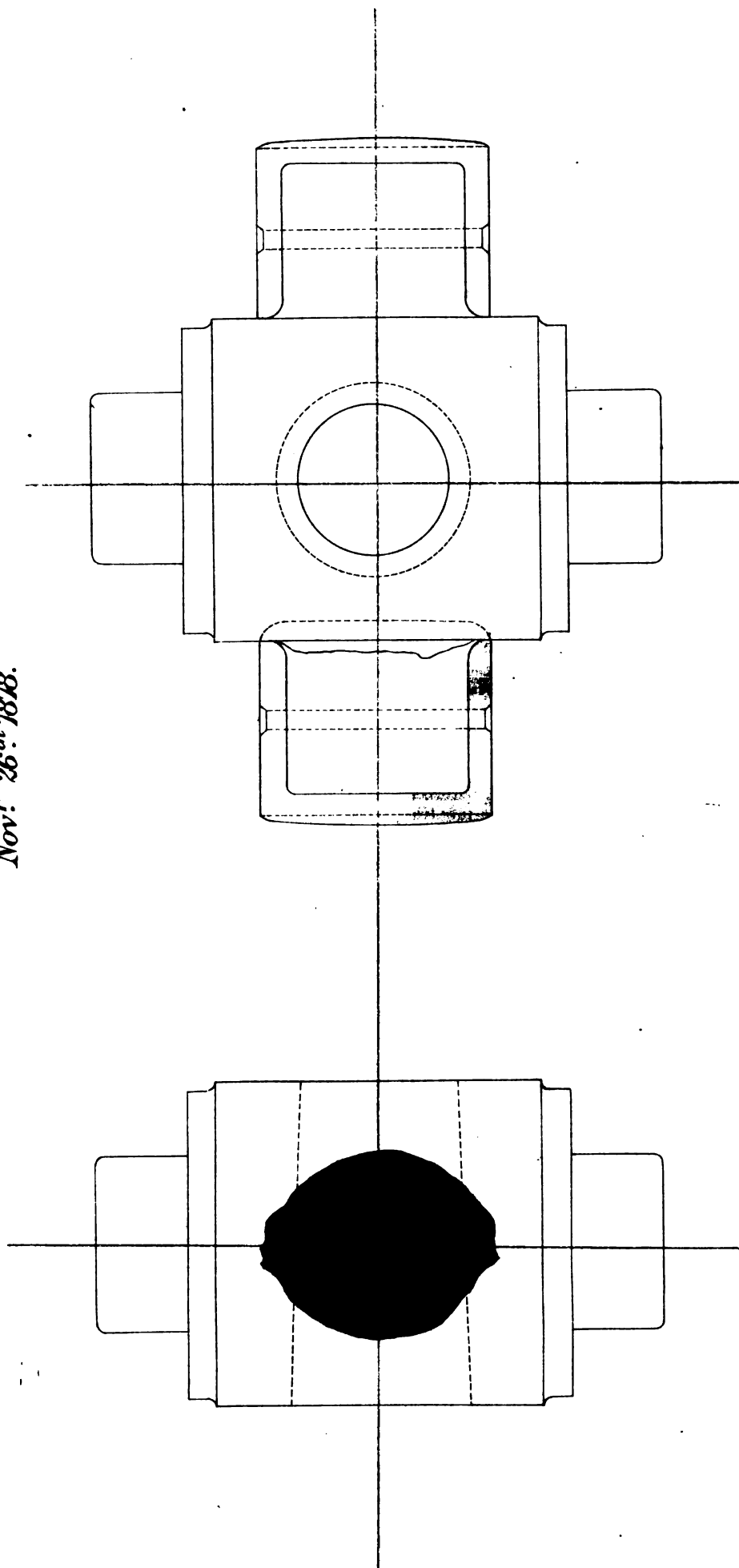
*To accompany Colonel Yolland's
Report dated 30th Nov^r 1878.*

DIAGRAM OF CROSSHEAD, ENGINE Nº 2147, SHEWING FRACTURE.

Half Size.

CREWE WORKS.

Nov^r 26th 1878.



Nº 2.

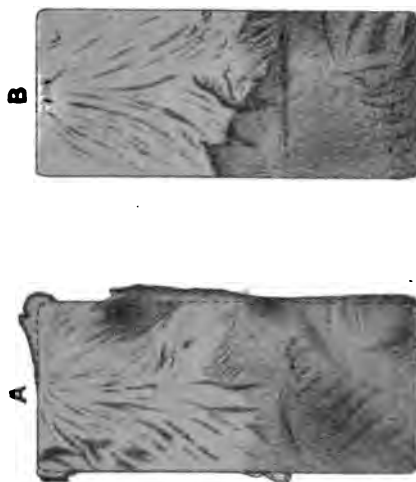
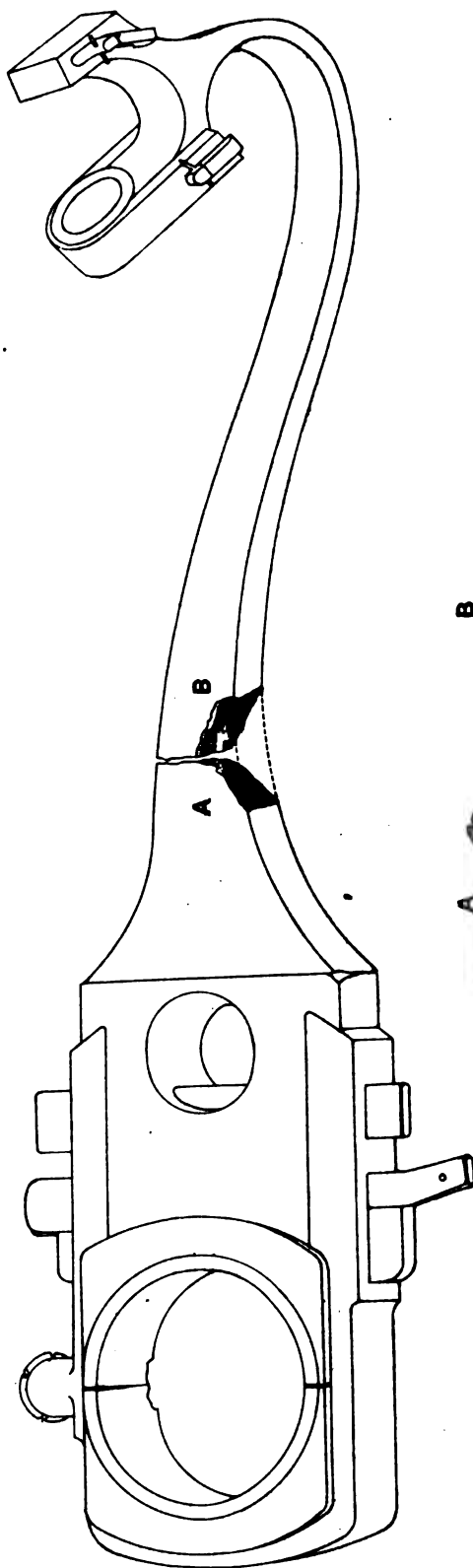
To accompany Colonel Yolland's
Report dated 30th Nov^r 1878.

DIAGRAM OF CONNECTING ROD. ENG. 2147.

Half Size.

CREWE WORKS.

Nov^r 27th 1878.





Nº 3.

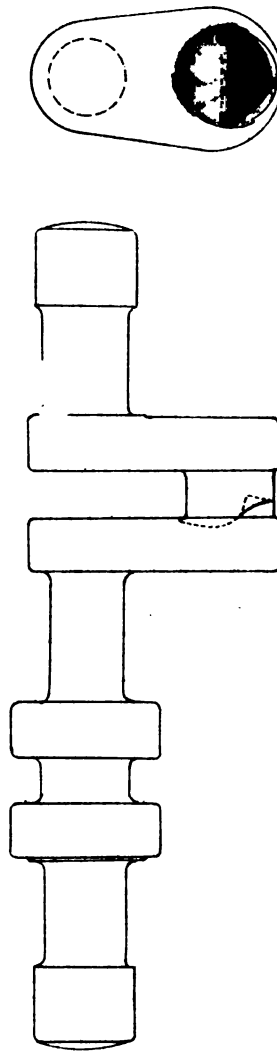
To accompany Colonel Yolland's
Report dated 30th Nov^r 1878.

DIAGRAM OF BROKEN AXLE. ENC. 2147.

Scale $\frac{3}{4}$ Inch 1Foot.

CREWE WORKS.

Nov^r 27th 1878.



passenger train, which had got off the rails and fouled the up main line, and the 3.15 a.m. up passenger train which was then due.

That a serious collision was avoided was owing to the engine-driver, William Oakes, of the down passenger train, having at once, as soon as he found that his train had fouled the up main line, proceeded to the Rylands siding signal-box, situated about 370 yards to the north of the spot where the engine had stopped; and he got there in time to warn the signalman of what had occurred, and to enable the latter to stop the up passenger train; and I consider that this engine-driver deserves great credit for having so promptly done his duty. He was not a minute too soon, as he heard the up train approaching before he reached the signal-box.

The accident was attributed at the time to the fracture of the crank-axle of the engine, but I agree with the opinion of Mr. Webb (the Company's Mechanical Engineer and Locomotive Superintendent), that the original cause of the accident was evidently due to the breaking of one of the pins or gudgeons of the right-hand cross-head, attached to the small end of the connecting-rod. The breakage of this pin, which is three inches in diameter, and of iron, liberated the small end of the connecting-rod, and allowed it to strike against the end of the piston-rod in the first instance, and then against and to knock out the cylinder cover, which dropped on the ground, and was the first indication found on the ground. The coupling-rod is then supposed to have struck the spectacle-plate and partially doubled up the small end of the rod (see diagram); and the liberated end of the rod then struck the sleepers and broke, and the other end of the connecting-rod, which remained attached to the crank-axle, was then forced through the outer and inner casings of the fire-box, just above the solid foundation-ring which was also considerably bent by the force of the blow; and then, and not until then, the crank-axle was broken.

The engine was new in 1874, and had run, since first starting, 169,789 miles.

There was no appearance of any flaw either in the broken crank-axle or broken connecting-rod which were both of steel of good quality. The engine was in the shops for repair from January to April of this year, at which time it is stated that there was no flaw apparent in the cross-head, which was of iron. The ends of the metals where this fracture took place were so filled with oil and dirt that no flaw could be distinctly seen, but I have no doubt that the breaking of this pin was the result of a gradual and increasing fracture commencing from the outside, and not of an instantaneous fracture resulting from any single blow, and I think it likely that if the cross-head had been examined on the day previous to the accident a circular crack on the outside of the pin would have been visible.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

APPENDIX A.

LONDON AND NORTH-WESTERN RAILWAY.

Locomotive Department,
Crewe Works, November 25, 1878.

Engine 2147 "Champion." In, 26th January 1878.
Out, 18th April 1878.

Details of repairs:

New copper tube plate and other slight repairs
to boiler.
New set of brass tubes.

Valve seatings faced.
Two new brass valves.
New piston heads.
Piston rods turned. Glands bored.
Slide bars faced. Slide blocks lined.
Connecting, coupling, and eccentric rods
repaired.
Valve motion repaired. Reversing gear repaired.
Injectors repaired. Springs repaired.
Tyres turned. New axle-boxes. Horn blocks
trued up.
New fire hole door. New mud and lead plugs.
Hand rails repaired. Cab repaired.
Boiler stays repaired. Safety valve repaired.

Printed copies of the above report were sent to the Company on the 21st December 1878.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., December 10th, 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 19th ultimo, the result of my inquiry into the circumstances attending a collision which occurred on the 15th ultimo at Rugby, on the London and North-Western Railway.

In this case, as the 12.45 a.m. up express from Carlisle, consisting of engine and tender, four horse-boxes, one carriage truck, one second-class, one composite, one third-class, one composite carriage, one break-van, one carriage truck, one saloon and two composite carriages, and rear break-van, or 15 vehicles in all, besides engine and tender, was approaching the Midland junction signal-box at the north end of Rugby station, at about 7.40. a.m., it came into collision, first with one loaded truck which had been uncoupled from a train of trucks attached to the shunting engine, and had been left standing on the up main line, and then with the tail of the train of trucks which was moving slowly ahead.

No passengers or servants of the Company were injured.

The engine buffers were broken, and also the ends of the truck first struck. This truck and one other were thrown off the rails.

There was no damage to the permanent way.

Description.

The Midland junction signal-box at Rugby, near which this collision occurred, is about 75 yards north of the down end of the station platform, and the station yard extends from this point northwards, as far as Trent junction, a distance of about three quarters of a mile.

Between Trent junction signal-box and Midland junction signal-box there are two others, viz., Leamington junction and Footbridge signal-boxes.

About 35 yards north of the Midland junction signal-box there is a connection between the coal yard on the up side of the line and the up main line, the actual point of collision being between this connection and the signal-box.

Midland junction up home-signal is situated 160 yards north, and Footbridge up home-signal, which is slotted as a distant-signal from Midland junction, is 345 yards north of Midland junction signal-box; Leamington junction is 650 yards, Leamington junction signal-box is 690 yards, and Leamington junction up home-signal for the main line 815 yards north of Midland junction signal-box.

The line is worked on the block system up to Trent junction, but from this point, through Rugby station, station yard working with an electric gong code is in use, although for through trains the whole yard is, under the existing rules, treated as one section, and block working is practically in force.

In stopping trains the drivers are, under Rule No. 51*d*, responsible that their engines are under such control that they can stop clear of any obstruction should the signals be against them.

The "Be ready" signal for approaching trains is passed on from box to box, so that the "Be ready" for an up train is received in Midland junction signal-box when the train is at Brincklow, $4\frac{1}{2}$ miles off, and shunting is supposed to cease when the "Be ready" is received.

The line is level and nearly straight.

Evidence.

John Molcher, signalman 11 years, four years of which in Midland junction box, Rugby, states.—On the 15th November I came on duty at 6 a.m. for an eight hour shift. At about half-past 7 a.m. the shunting engine brought 18 or 20 waggons out of the down sidings on to the up main line, and two engines and two breaks followed them. Two or three of the waggons were for the coal yard, and the remainder of them were for the south end of the station. The engines and breaks were for the coal yard. At this time there was a goods train standing in the station on the up main line, and this prevented the shunting engine from drawing ahead far enough to clear the points of the coal yard sidings. They stood there till about 7.34 a.m., when I received a signal from Footbridge cabin, two beats of the bell, for the up Scotch express. Just at this time the goods train went forward, and the shunting engine and the other two engines followed up in accordance with orders I had given. As soon as the points were cleared I set them, and the engines and break went back into the coal yard. The shunter then unhooked two or three waggons to be kicked back into the coal yard. I called out to him that he must go back altogether into the sidings, the Scotch express being signalled. He

started to set back, but hearing the Scotch express coming, and whistling for the signals, I thought it better to send him on, and the engine had just commenced to move ahead when the Scotch express came up and struck the tail of the rear waggon. The express came up at a good speed, perhaps rather faster than usual. At the time of the collision the shunting engine was between my box and the station, and the tail of the waggon about 20 yards north of the box. The Scotch express was due at 7.20. When I let the shunting engine come out from the down sidings the express was not signalled, and I do not know where it was, though I knew it was due. The practice is to continue shunting until the "Be ready" is received from the next cabin. The "Be ready" is passed on from one box to the other through the yard, and probably a train is two miles off when I receive the "Be ready." It arrived at 7.40. My up home-signal was at danger, and my up distant, which is a slot on Footbridge box up home-signal, was also at danger. There was no rule that the Footbridge box signalman should keep his slot on the Leamington junction signals, when my home-signal is at danger, but it has been done since this accident.

William Dytham, shunting porter two years, states.—On the 15th November at about 7.30 a.m. I brought out from the down sidings, on to the up line, the shunting-engine and 18 waggons. The last waggon was for the coal yard, and behind were two engines and two breaks, also for the coal yard. When the waggons got on to the up main line there was no room for the engine and waggons to get ahead over the coal yard points, because of a goods train in the up main line, and they had to wait for some minutes, six or seven I should think. When the goods started we drew ahead, and as soon as the points were clear the engine set back into the coal yard, and I signalled my driver to knock back the last waggon, which I had uncoupled. The signalman then called out that the engine and all the waggons were to set back into the coal yard, as the Scotch express was on. Just as he spoke I heard the express coming, and the whistle sounding. I looked round and saw it coming, then signalled to my driver to go ahead out of the way. He started to go ahead, and got a few yards when the collision occurred with the last waggon, which was left standing on the line. I had not had time to couple it on again. The express was running at about 8 to 10 miles an hour. The waggon was knocked over on to the down road, fouling both lines, and it was broken at the ends. The engine then struck the rear waggon, which had remained coupled, and knocked it off the road. It was a fine morning and the signals were clear. The rail was not a dry rail, a little greasy. The engine was whistling, but I did not notice any breaks except those on the tender, which were on. When the collision occurred I was nearly half-way along the waggons, so that I could not see the breaks on the train. When the collision occurred the shunting engine became uncoupled and ran ahead. I saw that the home-signal was against the train, but did not see the distant. I had got the signalman's authority for the shunting, as he had opened the points when the shunting engine whistled for them.

James Beach, passenger driver seven years, states.—On the 15th of November I was driving the up Scotch express, 12.45 p.m. from Carlisle. I took it at Crewe. We left Crewe at 5.45 a.m. 15 minutes late, and Stafford at 6.25 a.m., about 15 minutes late. The next stop was Rugby, where we were due at 7.20. The signals were right for us the whole way until I came in sight of the up home-signal at Midland junction cabin, which was at danger. I could see it about 300 yards off. I saw this signal before I saw the Footbridge cabin home-signal, which I did not see till close on it. It was at danger also. I was running about 15 or 20 miles an hour at the time. My steam had been shut off about three quarters of a mile back. My mate applied the breaks, and very soon after I sounded the whistle for the guards breaks, and then I pulled the break cord. The sand-boxes were opened, and acted properly. I cannot say if the guards breaks acted. I found the train was not pulling up, so I reversed my engine, and put steam against her.

All this failed to stop the train, and I ran into a loaded truck which was standing on the line, knocking it over, and then struck the tail of some waggon a little further ahead. It was not a clear morning for seeing, and the rail was very wet. I jumped off my engine before the collision, and so did my mate. We were not hurt. The train consisted of engine and tender, and fifteen vehicles, the two leading carriages coupled to my engine with chain break, but there were four horse boxes and a truck between. My engine is a 4-wheeled coupled engine, with hand break on tender, having one wooden break block on each of the six wheels. My engine buffers were broken, but there was no other damage to my train, and no vehicle off the rails. I pulled the break cord about the north end of the old shed.

Harry Nash, fireman about two years, states.—I had applied my tender break pretty firmly when passing Trent junction, as I generally do, but when the driver saw the Midland junction signal against us I went to tighten it up. The driver pulled the break cord at once. This was about 40 yards south of Leamington junction.

John Lambert, passenger guard 14 or 15 years, states.—On the 15th November I was in charge of the 12.45 a.m. up express from Carlisle, consisting of engine and tender, four horse-boxes, one carriage truck, one second-class, one composite, one third-class, one composite, one break-van, one carriage truck, one saloon, two composites, and rear break-van, 15 vehicles in all; besides the engine and tender. I was in the rear van, and worked a chain break on the van and the two composites. We left Stafford 19 minutes late, and were running the usual speed all the way, the signals being right. I never heard the driver whistle at all for the breaks or for the signals. I was looking out and saw the Midland junction home-signal at danger, I should say about 500 yards off, but some distance after passing Leamington junction. My hand-break had been applied soon after passing Leamington junction, but I did not apply my patent break till after passing the Footbridge. I then put it on, because I thought we were not going to stop at the signal. It was a wet, rough morning, and a greasy rail. I did not speak to the driver at all before the accident, but I did so afterwards, and he appeared quite sober. We were going at least 10 miles an hour when the collision occurred. No passengers complained of injury.

Henry James Killman, porter 1½ years, states.—I was acting as assistant guard to the Scotch express on the 15th November, and was riding in the front van. When we were reapproaching Rugby I heard a good deal of whistling, but cannot say whether it was from the engine of my train or not. I looked out and saw the Midland junction up home-signal at danger. My break was on at the time. I felt the patent break go on before I looked out, and this was a little this side of Leamington junction, from 40 to 60 yards.

Conclusion.

This accident was caused by the fault of the driver of the 12.45 a.m. up express, who neglected to comply with rule No. 51d in the Company's rule book, under the terms of which he should have taken steps to get his engine under such control that he could have stopped his train short of the obstruction on the line, the signals at Midland junction being against him.

He states that he did not see the Footbridge up home-signal, which was at danger, until he was close upon it, and that he saw the Midland junction up home-signal first, but only about 300 yards off. This statement, judging from the evidence of the guards as to the time when the breaks were applied, is probably pretty correct, and it is evident therefore that the driver cannot have been keeping a proper look-out, for both these signals are clearly visible for over 600 yards. He was also probably running at too high a rate of speed, for, by his own showing, there was an available

distance of at least 450 yards in which he failed to pull up his train. He would probably have been able to do so had he at once reversed his engine, as he ought to have done, and he would certainly have had no difficulty in doing so had he had at his command a proper continuous break.

Since the accident the signalmen at Footbridge and Leamington junction have been ordered to keep their slots on the home-signals of the signal-boxes in rear until the home-signal at the signal-box in advance has been lowered; and considering the very short distance between these boxes, it is most desirable that this order should be adhered to, for when, as in this case, there is a block which prevents the signalman from clearing the line, he should have some better means of covering the obstruction than a slot on a signal only 185 yards outside his home-signal.

If, however, it be found that, owing to the amount of traffic, this is impossible, a separate up distant-signal should be provided for Footbridge at or near Leamington junction, the lever working which distant-signal should be preceded by that working Footbridge up home-signal. The Footbridge up home-signal lever should also be mechanically controlled from Midland junction signal-box, so that it cannot be pulled over without the consent of the signalman in the latter signal-box, which would ensure a train being brought under control at Leamington junction, whenever there was an obstruction on the line which prevented the Midland junction up home-signal from being lowered, and would yet, under the existing rules, permit of it being brought forward cautiously as far as Footbridge up home-signal.

It would also be well if, in the code of gong signals in these signal-boxes, provision were made for a signal to block the line in cases of necessity, as in the present instance.

I have, &c.,

The Secretary,
(Railway Department,) Board of Trade.

F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on the 30th January.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., 29th November 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 21st instant, the result of my inquiry into the causes of a collision which occurred on the 19th instant, near Springs branch, on the London and North-Western Railway.

In this case, as the 6.0 a.m. down passenger train from Liverpool to Wigan, consisting of engine and tender, front break-van, one first-class, one second-class, two third-class, and one composite carriage, and rear break-van, was travelling between Ince Moss junction and Springs branch junction, at about 7.10 a.m., it came into collision with the tail of a coal train which was standing on the Liverpool branch about 350 yards outside the Springs branch down home-signal.

No passengers were injured.

The buffer-plank of the passenger engine was broken, and one goods waggon was slightly damaged.

The permanent-way was not disturbed, and the only vehicle thrown off the rails was the break-van of the goods train.

Description.

At Ince Moss junction the line from Liverpool and St. Helen's to Wigan, which runs from west to east, divides into two lines; the one to the right being continued over the London and North-Western main line, to join the Manchester and Wigan branch at Platt's Bridge junction; while the one to the left forms a loop, about 716 yards in length, up to Springs branch junction, where it joins the main line about a mile south of Wigan.

This loop is straight for about 150 yards, and is then on a 20-chain curve up to the junction.

The line is level, or nearly so.

Ince Moss junction is protected by the usual signals, the down home-signal being a double bracket signal, situated about 108 yards west of the signal-box, which is a little west of the junction points.

The down home-signal for the loop is slotted as a distant-signal from Springs branch junction-box, and there is a disc in Ince Moss junction-box, marked "line clear to Springs branch," and worked from Springs branch junction-box by the same lever which works this slot.

Springs branch junction-box is a little north of the junction, and the down home-signal is on a post carrying two down signals and one up signal, situated close to the box, and beyond the fouling point of the junction.

No. 31 lever in this box, which works the slot and disc at Ince Moss, is correctly interlocked with the other levers in the frame.

The point of collision was on the loop, 400 yards from Ince Moss junction, and 316 yards from Springs branch junction.

The Liverpool branch is worked on the block system up to Ince Moss junction, between which and Springs branch junction station yard working, with an electric gong code of signals, is in use.

Evidence.

John Newall, signalman three years, all of which at Ince Moss junction, states:—On the 19th instant I came on duty at 6 a.m. for an eight-hours shift. At 6.26 I got "be ready" from Brynn Hall, and at 6.27 "train on line" for a goods train. It arrived and passed at 6.32. I gonged it on to Springs branch No. 1 at 6.30, and, after asking for the slot to be taken off my home-signal, by giving five beats on the gong, I got permission for it to proceed at once, and, when it passed, the slot was off and the disc turned. At 6.36 I got the "be ready" and "train on line" for a coal train, and it arrived at 6.42. My signals were at danger, as the slot and disc from Springs branch No. 1 were not off. The train stopped for about four minutes at my home-signal, and at 6.46 I got permission for it to proceed, and it passed on. I then gave "line clear" to Brynn Hall, and at 7 a.m. I got "be ready" and "train on line" for another goods train. This train arrived at 7.5, and I shunted it on to the Lancashire Union out of the way of a passenger train, and then gave "line clear" back. At 7.5 I got "be ready" for the passenger train, and "train on line" at 7.6. When I got "train on line" for this train from Brynn Hall, I gonged it on to Springs branch. This was at 7.6, and at 7.8 I got permission from Springs branch for a train to approach. It arrived at 7.9, and, the signals being all right, it passed the home-signal towards Springs branch. It was a very foggy morning, and at the time I could not see the back lights of my home-signals. There was a fogman posted at the home-signal, and one later on at the distant-signal. I could hear the passenger train approaching, but could not see it. As far as I could judge, it must have been about 20 yards beyond my home-signal, when the disc from Springs branch was turned to danger, and I got six beats on the gong, three times in succession, indicating "block" or "obstruction." There was a long pause between each set of six beats, and I took it merely as a repetition, and not as a double set of six beats, meaning "imperative obstruction." The home-signal was thrown to danger by pulling off the slot, but the engine must have been past it. I ran to my window and shouted, and waved my red lamp. I could not get the driver's attention until he was opposite to the box. The fireman was on the driver's side, looking over his shoulder. Just as they passed, both driver and fireman heard me, and saw the light, and I saw the break applied. I kept on shouting to attract the guard's attention, which I failed to do. Soon after I heard the collision. The train was running fast, I dare say at 40 miles an hour, about the usual speed, and not slower, on account of the fog. The driver whistled for the breaks as soon as he saw and heard me. The guard came back after the collision. I had not cleared the line back to Brynn Hall. I cannot speak positively as to the speed of the train, but it was going as fast as usual. No train whatever came off the Lancashire Union.

John Gaynor, signalman four years, two years and nine months of which at Springs branch, states:—On

the 19th inst. I came on duty in Springs branch, No. 1 box, at 6 a.m., for an eight hours shift. The 4.40 a.m. fast goods train from St. Helen's left St. Helen's at 5.18 a.m., and had a clear passage through to Wigan. The next train signalled to me was a coal train or slow goods. I think this was at 6.32 a.m. My slot was on at the time. In about five minutes afterwards I took off my slot. This train came up in about four minutes afterwards, and was worked in the ordinary course up Springs branch, being kept not more than three or four minutes. The next train which was signalled was the 6.0 a.m. passenger train from Liverpool. As soon as I got it I signalled to Springs branch, No. 2, got a clear road for it, and took my slot off at Ince Moss. I called out to the fogman below, "Clear off the Lancashire main line." He shouted back, "Yes, it's here coming." Knowing that, from the time which had elapsed, this couldn't be the passenger train which I had taken my signals off for, I immediately threw up the slot, and sent back the "Imperative obstruction" signal—six beats, twice repeated, to Ince Moss, and it was acknowledged. I didn't receive any signal for either of the two goods trains which were standing between my box and Ince Moss. I believe there were in all three goods trains which passed Ince Moss between the fast goods train and the passenger train, and of these I only took my slot off for one. There is a telegraph clerk in my box, but I do not book trains. There was a relief signalman in my box at the time, but he was not on duty.

John Goff, guard six years, states:—I was guard of the 6 a.m. down train from Liverpool to Preston on the 19th inst. The train was made up as follows: engine, tender, break van, one first-class, one second-class, two third-class, and one composite carriage, and rear break-van. The front van and the leading carriage were fitted with chain break, and the rear van and rear carriage were also coupled with the same break. We passed Ince Moss junction at about eight miles an hour. I heard the driver whistle for my breaks, and heard a man shouting, after we passed the signal-box. I applied my break as tight as I could. My wheels skidded and slid. The collision was not very violent. I asked all the passengers if they were hurt, and none complained. We had a clear road all the way, and are due at Wigan at 7 a.m. I believe we were running to time. We were approaching Ince Moss junction at our usual speed.

William Shaw, platelayer, states:—On the morning of the 19th I came on duty at 7 a.m., as fogman at Ince Moss down home-signals. It was a very thick morning, but I didn't know when the fog commenced. I couldn't see the signals further than 15 or 20 yards I stood within five yards of the signals. I was not there when the goods train passed. I saw the signal lowered for the passenger train. I could hear the train coming at the time, but couldn't see it. I

walked towards it, and had gone about 50 yards, when I met it. My fog-signals had been down about 40 yards out, and I had taken them up after seeing the signal lowered. I showed a green light for the train to come on, and it passed me. I then heard the signal go up, but I should think the engine must have got past it. I then heard the signalman shouting. The train was not running very fast, but when I showed my green light the driver put on steam, and went ahead at, I should say, about 15 miles an hour.

William Wain, goods driver about three years, states:—On the morning of the 19th inst. I was driving a special goods train from St. Helen's to Springs branch. After leaving Brynn Hall I was not stopped till I arrived at the down home-signals at Springs branch, where I was stopped for about 40 minutes. I am quite certain that the Ince Moss down home-signal was off when I passed it. It was a foggy morning, but I could see the light. I left Brynn Hall at about 6.30. I followed close behind the fast goods train when it had passed Brynn Hall, and am certain there was no train between us.

John Higham, goods driver about five or six years, states:—On the morning of the 19th inst. I was driving a mineral train from Norley to Springs branch. I was stopped at Brynn Hall by signal, and again at Ince Moss junction. The signal was lowered for me at about 6.45 a.m. I also got a hand-signal from the signalman to proceed cautiously, but I am quite certain that the home-signal was lowered. It was a thick morning, but I could see the signal-box when I was standing at the signal-post; it came on thicker afterwards. I went on cautiously to Springs branch, and pulled up, seeing the tail-lights of another train in front of me. After standing for about 15 or 20 minutes, this train went on, and I drew up towards the home-signal post; it was so thick that I couldn't see the signal-box. As I was moving, the passenger train came up behind, and struck the tail of my train, but I couldn't feel it. I couldn't see the signals at the time. The train consisted of engine and tender, nineteen waggons, and break-van; the break-van was thrown off the rails. There was a fogman at the home-signal post, but I couldn't see him, for the fog, at the time I was struck. My head light was burning.

Samuel Skelland, passenger driver 25 years:—On the morning of the 19th instant I was driving the 6 a.m. passenger train from Liverpool to Preston,

consisting of engine and tender and six coaches, including two break-vans. We left Liverpool right time. We stopped at Brynn station, and left it at right time. The signals were off for me on approaching Ince Moss junction. I was coming at about nine or 10 miles an hour when I met the fogman, who signalled me on. I then increased my speed, and when I passed the home-signal it was off. When I came to the signal-box I heard the signalman shouting, and he showed me a light. I was not running over 10 miles an hour then. I shut off steam and shouted to my mate to pull the break cord; he did so, and also applied the tender break. I reversed the engine and got steam against her, and my mate and I opened the sand boxes. I whistled for the guard's breaks. The rails were so slippery that I couldn't pull up, and we ran into the tail of a goods train, which I couldn't see till I was close on it. I can't say whether it was moving forward or not. I cannot have been going above five or six miles an hour at the time. My tender wheels were skidding. There was no break on the engine, which is a four-wheel coupled engine. There was a screw-break on the tender, with one wooden block on each of the six wheels. The leading carriage, that is, the second vehicle from the engine, was fitted with chain breaks, which were applied from the engine. There was no guard in the front van. The shock of the collision was very slight, I hardly felt it. None of my train was off the rails. The only damage to my train was the breaking of the engine buffer-plank.

George Watson, relief signalman, states:—I was in Springs branch No. 1 box on the morning of the 19th instant. I was there on duty, but not in charge. I was sitting near the gong worked from Ince Moss. The fast goods train was signalled and passed at about 6.30 a.m.; then an ordinary coal train was signalled at about 6.42, the slot having been asked for. This train arrived and went up Springs branch. About four minutes afterwards Ince Moss gonged on a passenger train, and "line clear" was given for it to come. The signalman called out to the fogman, "All right off the Union," and he replied, "Here is the train." Gaynor said, "What is it?" and he replied, "Coal train." Gaynor then threw up his signals, and blocked the line. I am certain that only one train was signalled between the fast goods and the passenger train, and the slot was not taken off for any other train. There were two standing on the line at the time of the collision. The one in front started to come on when the signal was lowered for the passenger train.

Conclusion.

The foregoing evidence shows clearly that this accident was due to the mistake of one or other of the signalmen at Ince Moss junction and Springs branch, No. 1, and, as is usual in such cases, the statements of these two men directly contradict each other.

The signalman at Ince Moss asserts that he signalled forward to Springs branch, No. 1, two goods trains, at 6.30 a.m. and 6.36 a.m., between the "fast goods" and the 6.0 a.m. passenger train, and that the slot worked from Springs branch was taken off for these trains, which passed on at 6.32 a.m. and 6.46 a.m.

The signalman at Springs branch, No. 1, is equally positive that only one train was so signalled to him at about 6.32 a.m., and that this train having been kept waiting at his home-signal for only about four or five minutes, was sent on up the branch. He declares that his slot on the Ince Moss home-signal was taken off for this train only, between the "fast goods" and the 6.0 a.m. passenger train, and his statement is, on the whole, borne out by that of a relief-signalman, who was in his box at the time, though not on duty.

From the other evidence, however, it seems certain that these two men are mistaken. It is quite clear that at the time of the collision there were two goods trains standing outside the Springs branch home-signal, both of them having been kept there for a much longer period than the four or five minutes stated by the signalman in this box. The driver of the first of these trains is sure that no other train can have been

running between him and the "fast goods;" and both these drivers state that the Ince Moss home-signal was off for them to pass, which could not have been the case, unless the slot had been taken off from Springs branch, No. 1.

From an examination of the signalman's books it appears that the goods train, which went up the branch at about 6.40, did not come off the Liverpool line at all, and it was probably a main line train, which was, in the dense fog which prevailed at the time, mistaken for one of the trains signalled from Ince Moss.

As, therefore, the statement of the signalman at Ince Moss is corroborated by the two drivers, and the story of the two men in Springs branch No. 1 box, is, on the face of it, incorrect, I am of opinion that the signalman in the latter box is the one to be blamed for this collision; but I must point out that in this case, as in another which I have recently reported upon, this signal-box is not provided with a register for booking the running of trains, which, if properly carried out, cannot fail to be of great assistance to signalmen in keeping before them the signals they have received, and which, therefore, must conduce to the safety of the travelling public.

The driver of the passenger train appears to have done what he could to stop his train, but was unable to do so on account of the greasy state of the rails. If, however, he had had under his control a proper continuous break, he would probably have been successful.

I have, &c.,

The Secretary,
(Railway Department,)
Board of Trade.

F. A. MARINDIN,
Major, R.E.

Printed copies of the above report were sent to the Company on the 30th December 1878.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, Whitehall, London, S.W., 11th January 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 19th ultimo, the result of my inquiry into the circumstances connected with a collision that occurred on the 11th ultimo, between two down goods trains; and of a subsequent collision which happened, between a truck (that was knocked off the rails by the first collision, and which stood foul of the up main line) and a passenger train, near Widnes station, on the London and North-Western Railway.

One passenger complained at the time of the collision of being hurt, but the Company have not subsequently received any particulars of this case.

One of the goods train engines had its buffer-plank and buffers broken, and the steps of the break-van next to the engine damaged. The passenger train engine had its smoke-box stove in, and the right-hand driving splasher and hopper were damaged. In the goods trains, one waggon was broken up, and 11 others were more or less damaged (*see* details, Appendix A), out of 20, which were thrown off the rails by the first collision.

Description.

Widnes station is situated on a portion of a deviated line which was opened for traffic in 1869, between Liverpool and Warrington, and it is about $12\frac{1}{4}$ miles from Liverpool.

The traffic on this line from near Warrington is worked on the absolute block system as far as the Widnes station signal-box; but from thence to the West Deviation junction signal-box, where there is a junction with the Widnes goods yard lines, a distance of 783 yards, and onwards to Ditton junction east signal-box, the traffic is worked on the permissive system.

The Widnes station signal-box is at the Warrington end of the up platform, opposite to a junction of a short branch line which connects this Widnes Deviation line with the line from St. Helen's to Widnes dock. The down distant-signal worked from the West Deviation junction signal-box, is 180 yards on the Liverpool side of the Widnes station signal-box, and the down home-signal is about 70 yards from the West Deviation junction signal-box. The line falls from near the Liverpool end of Widnes

station to the West Deviation junction signal-box, at first at an inclination of 1 in 95 for a length of about 380 yards, then on an inclination of 1 in 410 to the down home-signal for about 120 yards, and thence level to the signal-box.

The first collision occurred on the down main line about 280 yards inside the down distant-signal worked from the West Deviation junction signal-box, on the incline of 1 in 95; and the second collision, on the up line, about 55 yards nearer to Widnes station than where the first collision occurred.

At Widnes station signal-box the signalman on duty records the time of the down trains entering the block section at Carter House junction as notified by the telegraph; also of the time of the arrival of the train, and of its departure from Widnes station; but no record is kept by the signalman at the West Deviation junction signal-box of the arrival and departure of the trains, as it is stated that the signalman there has so much to do, with the shifting of the points and signals for the shunting of the mineral and goods trains in the adjacent Widnes goods yard, that he would not be enabled to make the requisite entries in the train telegraph book.

I should also state that Carter House junction signal-box is about 1400 yards from Widnes station signal-box.

Evidence.

Thomas Wilkinson, signalman five years, and about 12 months in the Widnes station signal-box, states: I came on duty at 7.0 a.m. on the 11th instant. At 5.18 p.m. I received a signal from Carter House signal-box for a pilot engine and train. At 5.27 I received another signal indicating that the pilot engine and train had entered the section, and at 5.37 the pilot engine and train came up to my home-signal, but did not pass it. (The home-signal is at the signal-box). At 5.22 I received a signal from the Locomotive junction for an engine and goods train, and this train passed my box at 5.25. I had signalled it on to the Widnes West Deviation signal-box as soon as I received that signal from the Locomotive junction, the line being clear for it; and I also received another signal from the Locomotive junction at 5.25 for a coal train, and it passed my box at 5.34. The signals which I sent on to the West Deviation signal-box were acknowledged on the telegraphic instrument, and the distant-signal was pulled off for the first train to proceed. I also signalled the coal train, which passed my box at 5.34, on to the West Deviation signal-box. The telegraph signal was acknowledged, and the out-of-door signal was pulled off for that train also to go on. I also received another signal from the Locomotive signal-box at 5.34 for a coal train. I passed that signal on. It was acknowledged from the West Deviation signal-box, and the train passed my box at 5.37. The signal was taken off for it to proceed. The first of the three trains went into the Widnes goods yard, and the two others went on to Garston. As that train passed, the pilot engine and train drew up towards my junction, and I signalled it to the West Deviation signal-box as soon as I saw that the preceding train, the coal train, had passed the down distant-signal worked from the West Deviation signal-box. The telegraph-signal for the pilot engine and train was not acknowledged from the West Deviation junction signal-box, but I lowered my main-line home-signal, and ran the train down to my junction, and allowed it to go on, after cautioning the driver with a green light. I gave a second signal to the West Deviation junction signal-box, and then the distant-signal was put to "danger." The pilot engine and train found the distant-signal worked from the West Deviation junction signal-box off; it had been taken off for the previous coal train, but it was put on before he passed it, and it was at "danger" when the pilot engine passed it. The pilot engine passed my box at about 5.39. When the pilot engine and train had passed my junction it stopped, and the after part of that train, with an engine as the last vehicle, took 50 waggons back along the line to the Locomotive junction, while the front part, consisting of an engine and 28 waggons, went on towards the West Deviation. At 5.59 I got a goods train from Goole on from Carter House junction, and I gave permission for

it to come, and I passed the telegraphic signal on to the West Deviation junction for the goods train, but the "Be ready" signal was not accepted. There is an indicator in my box, which was pegged over to "train on line"; that would be for the pilot engine and train. I then gave the signal for the train entering the section (that is between Widnes station box and the West Deviation box), and the signalman acknowledged that signal by unpegging the telegraphic needle and by lowering the distant-signal. That Leeds goods train passed my box at 6.6 and found the distant-signal off. That is all that I know about the affair.

COPY of WIDNES STATION Train Telegraph Book, 11th December 1878.

Entries made by Thomas Wilkinson, signalman
on duty.

Train.	Train entering section.	Arrival of Train.	Departure of Train.	From	To
Pilot - - -	5.18	5.27	5.37	Carter House	West Deviation junction.
Salt (engine and break).	5.22	5.25	5.25	Widnes	Crewe.
Coal - - -	5.24	5.34	5.34	Wizan	Garston.
Coal - - -	5.34	5.37	5.37	Sutton	Garston.
Goods attention 5.59	5.59	6.6	6.6	Leeds	Edgo Hill (fast goods).

John Plumpton, signalman 5½ years.—I came on duty at 3 p.m. on the 11th December. I do not keep any record book at the West Deviation junction signal-box. At 5.34 a salt train and engine and break passed, and was put into the Widnes goods yard. The 5.37 from Widnes passed my box at 5.40—a coal train going to Garston. I expected a pilot engine out of the yard, and kept the needle at "train on line." There was a coal train from Widnes station, which passed on to Garston before the salt train that passed at 5.34. Before 6.1 I had changed the needle from "train on line" to "line clear." At 6.1 p.m. I received the "attention" signal from Widnes and acknowledged it. The "Be ready" signal was also given from the station, but given incorrectly. I did not answer it. The bell did not ring properly. I heard the hammer make the strokes, but they did not sound the bell. The "train entering section" signal was given to me about 6.6 p.m., and I pulled off the down distant-signal and also the down home-signal. I had had these signals off about five or six minutes when I heard the closing up of the waggons. I went to the window of the signal-box and then I saw the pilot engine and train, which either had not been

signalled to me, or the signals had failed to reach me, no bell having been sounded. The night was clear, but there was steam from the adjoining works which prevented me from seeing across the junction, and there was a great noise from a machine called an "agitator," which prevented me from hearing. I never received any signal from Widnes station box between the 5.37 to the 6.1 signals, and therefore I did not know of the pilot engine and train being on the bank until after the collision had taken place. I was not out of the signal-box between 5.37 and 6.1, but there was a telegraph clerk in the box for the whole of that time. I did the working of the train telegraph instruments, and the clerk had to do with the speaking instruments. The up passenger train passed at 6.11 or 6.12, going towards Widnes station, and immediately afterwards the driver of the Leeds goods train sounded the alarm whistle, and that was the first intimation that I had of anything being wrong.

Patrick Gill, engine-driver nearly four years, and eight years in the Company's service.—I was driving the pilot engine No. 144 (tank engine) and a mixed train of minerals and empties when we got to Widnes station. The front portion, or my portion of the train, consisted of 28 or 30 trucks, partly empties; and as I approached the station both distant and home signals were on at "danger." I passed the distant and drew up at the home, and stopped there about five minutes. Then the home-signal was lowered, and I ran on to the station; and as I approached the distant-signal worked from the West Deviation junction signal-box I saw the signal placed at "danger." The train was uncoupled into two parts as we were travelling very slowly forwards. I did not see that distant-signal taken off again; it was put up as I was passing under it. I then ran on towards the West Deviation down home-signal and stopped about 20 yards on the Widnes side of it about seven or eight minutes before 6 o'clock, and the collision occurred not more than five minutes past 6 o'clock, to the best of my belief. I heard a whistle from the following train, and I started ahead as quickly as I could, the down home-signal being still on at "danger," and it remained on at "danger." I passed it at "danger." There was one waggon at the tail of my train which had a pair of wheels off the rails, but no truck from my train fouled the up line. I don't know what time it was when we passed the West Deviation junction signal-box; it could not be far from 6.5 p.m. The previous train passed out of sight before I left Widnes station. I saw it pass whilst I was standing at the Widnes down home-signal.

Henry Lewis, fireman to P. Gill, 3½ years a fireman, confirmed the driver's statement.—We stopped at the home-signal five or ten minutes. We left the one waggon which was thrown off the rails and went on.

Thomas Waldron, shunter 12 months, and two years in the Company's service, states: I was acting as breaksman to the pilot engine and train, which started from the Carter House junction, and the train was made up of two parts; the front part was intended to go into the goods yard at the West Deviation junction, and the rear part was going on the line to St. Helen's. The front part consisted of about 30 waggons, and I rode on the last waggon. The rear part consisted of about 45 waggons, and there was an engine attached to the last waggon, so that when the train started from the Carter House junction there was an engine attached to each end of the train. The train stopped at the down main-line home-signal about 10 minutes or a quarter of an hour. It was rather thick, with gas from the works, about the place. We started about 6 o'clock to go forward to the West Deviation junction, and we stopped after we had passed the Widnes junction home-signal for the purpose of uncoupling the rear

part of the train from the front part. We stopped with the waggon in which I rode on the West Deviation side of the West Deviation down distant-signal, and that signal was off as my train passed that distant-signal before we stopped for the purpose of uncoupling. I did not see that distant-signal put up to "danger" while we stood there. We then started again and drew forward towards the West Deviation home-signal. I don't know how far the engine of my train was from the West Deviation junction home-signal when we stopped. I could not see, on account of the gas. We stopped there about 10 minutes before another train came up and ran into us. I did not look at my watch, so that I cannot say at what time we stopped at the West Deviation junction down home-signal. My train was just on the move when the Leeds goods train came up and ran into the tail of my train. I don't know whether the West Deviation junction home-signal was on or off as we passed it. I had a red light on the last waggon in my train. The driver of the Leeds goods train whistled before the collision. The Leeds goods train was at the distant-signal when I first saw it coming; it might be about 100 yards back; and when the Leeds train had got to about 60 yards from the last waggon of my train, the driver began to whistle. The Leeds train was running between 20 and 30 miles an hour when it ran into the rear of my train. A pair of wheels of the last truck in my train was knocked from under the truck, but they did not foul the up line. That was the only damage done to my train. Neither the engine nor tender of the Leeds train were thrown off the rails, but about six trucks in the Leeds goods train were knocked off the rails, and most of them were broken. I don't know anything of a single wheel and a part of an axle having fouled the up line. When I saw that a collision was likely to take place I jumped out of the truck in which I had been riding. My train ran on to the West Deviation junction at once, leaving the last truck in my train behind, as the coupling had been broken; one pair of wheels of that truck remained on the rails. We got to the West Deviation about 20 minutes past 6 o'clock, and were then put into the goods yard. As soon as the collision with my train took place I ran forwards towards the West Deviation junction signal-box for the purpose of stopping the up passenger train, and I had got close to the West Deviation box before the passenger train passed me. I showed a red light towards the train and whistled. I walked down the 6-foot space, and the driver appeared to notice me. I think he shut off steam, and I saw the fireman putting his break on. The driver of the passenger train also whistled. I think the passenger train, when it passed me, was travelling about 30 miles an hour.

Albert Lambert, engine-driver 11 years, and 15 years in the Company's service, states: I was driving No. 1239 engine with a goods train—11.15 a.m., from Leeds to Liverpool. We stopped at Warrington, being a little behind time. We had 48 waggons, including the break-van, mostly empties. We were not stopped after leaving Warrington, and as we approached Widnes station the signals were all right for us to proceed. No caution signal was shown to us as we passed the Widnes station signal-box, and the West Deviation junction down distant-signal was off as we approached. It remained off until we had passed it. The first intimation which I received of anything being on the line in front was when I ran into the waggons in front. There was no red light of any kind shown to me. I was running about 15 miles an hour at the time. Neither my engine nor tender were thrown off the rails, but I think about 20 trucks were thrown off the rails. I saw some were broken, but I do not know how many. There was a waggon of my train thrown, projecting towards the up line. As soon as the collision had taken place I ran back to see if anything belonging to my train had fouled the up line, and I found that a waggon was foul of it; and I then told my fireman

to pop the whistle to warn any up train. Owing to my engine blowing off steam so strongly, my fireman could not hear me, and I ran back to the engine and used the whistle myself. There might be an interval of perhaps two minutes between the time when my train ran into the waggons in front and when the passenger train on the up line arrived. I don't know whether the passenger train engine had the steam on or off when I first saw it, but I had heard a whistle from it; it was pulling up as it passed me, and it ran past me for the length of about 15 waggons, and had come in contact with the waggon of my train which I had seen foul of the up line. I think the first collision occurred about 6.10 p.m. I cannot say how many trucks in my train were knocked off the rails. I was knocked down among the coals in the tender, but not hurt.

William Edwards, fireman to A. Lambert; fireman four years, and seven years in the Company's service, states: As we approached Widnes station the signals were all right for us to proceed, and the signalman stood at the window and waved a white light. After we passed that box, the distant-signal for the West Deviation junction was also at "all right," and I then put on some coals; and after I had done so the driver shut off the steam and began popping the whistle; that took place before the collision occurred; he had not time to tell me before the collision occurred, and I had not time to put the break on before the collision took place. I think we were running 10 miles an hour when I put on the coals. After the collision occurred my mate told me that he had seen some one run from the siding towards the line on which we were running, and he was shewing a red light.

William Bradshaw, engine-driver nine years, and 15 years in the Company's service.—I was driving No. 468 engine attached to the 5.30 p.m. train from Liverpool. As we approached the West Deviation junction the signals were all off for us to proceed, and the first intimation which I received of anything being wrong was the seeing a red light near where the waggons were. Some one shouted just after we had passed the West Deviation box—some 50 yards past that box. My train was appointed to stop at Widnes, and I had shut off the steam before I reached the West Deviation box. As soon as I saw the red light I reversed the engine and whistled for the breaks. I was running about 15 or 16 miles an

hour when I passed the West Deviation box; and I had reduced the speed to about six miles an hour, when my engine came in contact with a waggon which had fouled the up line. My engine mounted an axle which was lying in the 4-foot of the up line, and the leading wheels of my engine were thrown off the rails; nothing else in my train was thrown off the rails. The smoke-box of my engine was damaged.

Francis Brennan, extra guard, six years in the Company's service, states: I was acting as guard to the 5.30 p.m. passenger train from Liverpool to Manchester. The train consisted of engine and tender, 2 third-class, 2 composites, and 2 break-vans; one van at each end of the train. I rode in the last van. We left Lime Street at 5.30. We reached Ditton at 6.4, and left at 6.5 p.m., and I did not become aware that anything was wrong until about 6.12 p.m., when I heard the driver of my train popping the whistle for the break. We were just then passing the West Deviation junction signal-box. I applied my break at once, and we did not run much more than 50 yards after I heard the whistle for the breaks before the engine of my train ran into a broken axle with one wheel on it, which was lying in the middle of the 4-foot of the up line. We were not running more than about six miles an hour at the time the engine struck the wheel. The leading wheels of the engine were thrown off the rails, but nothing else was thrown off the rails. This occurred about 6.12 p.m. A piece of the step of the front van was knocked off; no other damage was done to the carriages. I did not hear any persons complain of being hurt.

William Appleton, inspector of traffic.—I got to the scene of the collision about 6.30 p.m. Both lines were blocked—the up line by one waggon, and a wheel and broken axle belonging to that waggon, which belonged to the Leeds goods train. Ten waggons of the Leeds goods train were thrown off the rails down the embankment on the down side, or south side of the line, and one of the waggons was on the top broken; these were left behind by the Leeds goods train, and then about seven other waggons in the Leeds train, which were drawn forward, with a pair of wheels off the rails, but not damaged. The steps of the front break-van in the up passenger train were slightly damaged. There was no other damage in the up passenger train.

Conclusion.

From the preceding statements it appears that a telegraphic signal was received at the Widnes station signal-box from the Carter House junction at 5.18 p.m. for a pilot engine and train attached; and a second signal was received at 5.27 p.m., indicating that this train had entered the block section between Carter House junction and Widnes station. This train, which was made up of two trains, with an engine at each end, is said by the signalman to have reached Widnes station home-signal at 5.37 p.m., and stopped there.

In the meantime the Widnes station signalman (Wilkinson) had received a signal from the Locomotive junction, on the short connecting branch line, at 5.22 p.m. for an engine and goods train (a salt train), and this train passed his box at 5.25 p.m. towards the West Deviation junction, he having sent on the signal to the West Deviation junction signal-box as soon as he received it from the Locomotive junction. A signal was received by the Widnes station signalman for a coal train at 5.25 p.m. also from the Locomotive junction, and the train passed his box at 5.34 p.m., the telegraphic signals for these two trains having been acknowledged by the West Deviation junction signalman (Plumpton), and the out-of-door signals having been pulled off for them to pass. At 5.34 p.m. the Widnes station signalman received another signal from the Locomotive junction for another coal train, and he says he passed this signal on to the West junction signal-box, and it was acknowledged, and the train passed his box at 5.37 p.m., the down distant-signal having been taken off for it to proceed.

As this last train passed, the pilot engine and train before referred to drew up to the junction, and the signalman says he signalled it on to the West Deviation junction

signal-box as soon as he saw that the preceding coal train had passed the down distant-signal worked from the West Deviation junction signal-box. The signalman (Wilkinson) admits that the telegraphic signal for the pilot engine and train was not acknowledged from the West Deviation junction, and he states that he lowered the main line home-signal, and allowed the pilot engine and train to proceed, after cautioning the driver with a green light. This pilot engine and train was here divided into two parts, the pilot engine taking on the front part of 30 waggons, while the engine at the rear of the train, after the front part had been uncoupled (while still running or after it had stopped is uncertain), hauled the rear portion consisting of 50 waggons back on the short connecting branch line towards the Locomotive junction. The signalman further states that this pilot engine and train passed his box at 5.39 p.m., but that is partially contradicted by the record in the train telegraph book, where it is entered as departing at 5.37 p.m., the same time as is noted for the departure of the second coal train.

The pilot engine and train then drew ahead, and stopped about 20 yards short of the West Deviation junction down home-signal about 5.52 or 5.53 p.m., according to the driver; and it consisted at this time of an engine and 30 waggons, the breaksman riding on the last waggon, showing a red light to the rear.

At 5.59 the signalman at Widnes station received a telegraphic signal for a goods train from the Carter House junction on the main line, and he gave permission for that train to come on, and he passed the telegraphic signal on to the West Deviation junction signal-box, but the "Be ready" signal was not accepted, and the indicator in his box remained pegged over to "train on line," and he thought it was for the pilot engine and train. He then gave the signal for the "train entering section" (between Widnes station and the West Deviation box), and the signalman at the West Deviation junction signal-box acknowledged that signal by unpegging the telegraph needle, and by lowering the down distant-signal. He also says that the goods train from Leeds then passed his box at 6.6 p.m., and found the down distant-signal worked from the West Deviation junction signal-box off for him to proceed, and this is confirmed by the driver of the Leeds goods train. The fact appears to have been that the pilot engine and train passed on towards the West Deviation junction while the down distant-signal was off for the preceding coal train, and the signalman at the West Deviation junction signal-box was not aware that the pilot engine with a train behind had closely followed the preceding coal train, and that it was standing for more than 10 minutes, according to the evidence, at not more than about 90 yards from his signal-box. It is however stated that the view was very limited, owing to the steam from the adjacent chemical and mineral works.

The train attached to the pilot engine was run into by the Leeds goods train, which passed the Widnes station signal-box about 6.6 p.m. The evidence disagrees as to the speed at which this Leeds goods-train was running at the time the collision occurred, the signals at Widnes station being at "all right" for the train to proceed to the West Deviation junction box,—the driver stating it at 15 miles an hour, while the breaksman at the tail of the pilot engine train estimates it at from 20 to 30 miles an hour. At all events, it must have been travelling at considerable speed, from the number of waggons thrown off the rails and the number damaged.

This first collision was almost the natural result of working the traffic on the permissive system between Widnes station and the West Deviation junction box, which, as previously stated, are only 783 yards apart. Two trains were improperly permitted by the signalman at Widnes station to follow each other so closely past the Widnes station signal-box that the same time for departure, 5.37 p.m., is entered in the train telegraph book against the coal train which had reached Widnes junction by the short connecting branch line, and for the pilot engine and train which had been drawn up at the down home-signal on the down main line. The signals taken off for the coal train remained off as the pilot engine and train followed it. The collision would not in all probability have occurred at all if the driver of the pilot engine and train had made known to the signalman at the West Deviation junction, either by sounding his whistle or by sending his fireman forward to the signal-box, that he was waiting at the down home-signal for permission to proceed. There is however a material discrepancy in the statements of the driver of the pilot engine and train, and the signalman at the West Deviation junction, as the latter states that his down home-signal had been taken off five or six minutes before he heard the closing up of the waggons. The driver of the pilot engine, on the other hand, says that he started ahead as quick as he could when he heard a whistle from the following (Leeds goods) train, the down home-signal being still on at "danger."

I think the London and North-Western Railway Company will do well to make a point of having a record kept in the West Deviation junction signal-box, by employing a lad to make the necessary entries in a train telegraph record book, if the labour be so great in the signal-box as to prevent the signalman from making the entries.

The second collision happened between an up passenger train, 5.30 p.m. from Liverpool to Manchester, which consisted of an engine and tender, and six vehicles, including two break-vans, one at each end of the train, and a truck which had belonged to the down goods train from Leeds that had been thrown off the rails and stood foul of the up main line, with one wheel and a broken axle between the rails, about 55 yards nearer to Widnes than the spot where the first collision had occurred. The driver of the passenger train states that the first intimation he had of anything being wrong, the signals being at "all right" for him to proceed, was the seeing of a red light, and hearing some one shout when he had passed the West Deviation junction signal-box, about 50 yards; and as soon as he saw the red light he reversed his engine, and whistled for the breaks. He was running at the time, with the steam shut off, at about 15 or 16 miles an hour, having to stop at Widnes station, and he thinks he had reduced his speed to about six miles an hour when his engine came in contact with the waggon, and mounted the broken axle, and the leading wheels of the engine were thrown off the rails.

The spot where this second collision took place is about 376 yards from the West Deviation junction signal-box, and I may therefore state with confidence that if the passenger train had been fitted with continuous breaks placed under the control of the engine-driver, this second collision might have been avoided.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

(APPENDIX A).

Waggons damaged in accident at Widnes,

11th December 1878.

London and North-Western waggons :

1562. One headstock end, 2 soles, 3 axle guards, and 1 axle broken.

1984. One headstock slightly damaged.

20,489. One headstock, buffer, and side broken.

22,678. Two soles, 1 end, 1 diagonal, and 2 end mountings broken.

4422. Broken up.

166. One headstock, side, crib-rail, and 2 end planks broken.

97. One buffer cylinder broken.

30,497. Sides broken.

18,535. Two pairs of wheels from under and 4 axle guards bent.

23,785. One side rail broken and 4 axle guards bent.

North-Eastern Railway waggons :

60,341. One headstock, 1 sole, and 1 side broken.

26,965. Two buffer castings and breakwork broken, 2 buffer rods bent.

Printed copies of the above report were sent to the Company on the 30th January.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, Whitehall, London, S.W., 9th January 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 19th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 16th ultimo, between a passenger train and a light engine, not far from Tyldesley station, on the London and North-Western Railway.

It is stated that about 20 persons have complained of having been injured on this occasion, including the driver, fireman, and guard of the passenger train.

The passenger train engine had its buffer-plank, angle-irons, framing, cylinder cover plates, valve spindle glands, smoke box, blast pipe and jet pipe broken, and the tender buffers and back of the tank stove in. The goods engine had the tender buffer-plank framing and tank broken, and one carriage in the passenger train was damaged.

Description.

There are signal-boxes at each end of the Tyldesley station; and on the east of Tyldesley station there are colliery sidings, called Green's sidings, north of the line and a signal-box on the south of it for the working of the traffic. This signal-box is about 718 yards to the east of No. 1 or the Tyldesley east signal-box.

There are three lines of rails between Tyldesley and Green's sidings, and Hough Lane beyond it; two passenger lines, and a loop or goods line, lying on the north side of the up main line.

The traffic between No. 1 signal-box at Tyldesley station and Green's sidings, and Hough Lane, is worked on the permissive system.

At Green's siding there is a through-crossing line commencing at the sidings nearly opposite to the signal-box, thence across the loop and up main lines to the down main line. This crossing is protected by the up home and distant signals, the up home signal being placed 119 yards west of the signal-box, and 40 yards west of where the through crossing passes across the up main line.

Evidence.

John Wright, signalman in the Tyldesley east signal-box, five years a signalman, states: I came on duty on Monday the 16th instant at 6.40 a.m. At 9.48 a.m. I received from No. 2, or the north Tyldesley signal-box a signal for the 7.45 a.m. passenger train from Liverpool, through St. Helen's, for Manchester. It stopped at Tyldesley station, having arrived there at 10.10 a.m., and it left at 10.14 a.m. About 9.56 I telegraphed that train on to the next box (at Green's siding), and that signal was acknowledged; the distant-signal was taken off, and my starting-signal was lowered in the usual manner for the train to proceed. There is a disc-signal in my box which shows when the distant-signal worked from Green's siding signal-box is off and the line is clear, but it does not prevent me from taking off any signal. That disc-signal showed that the line was clear. It was a very foggy morning, and I could not see as far as Tyldesley station, nor yet the up starting-signal. I heard the train come into the station. I received the signal from Green's siding to block the up line at 10.17 a.m., and I do not know anything more about the matter. I did not hear any whistle after the train passed my box. Before I received the signal to block the up line the distant-signal was put on at "danger" after the train had passed, when, perhaps the passenger train had got 100 yards past the distant-signal.

Daniel McMulty, signalman nearly three years.—I was on duty at Green's siding signal-box on the 16th December, and I came on duty at 6.30 a.m. I received a telegraphic signal for what I believed to be a passenger train from Tyldesley No. 1 signal-box about 9.48 a.m., and I passed the signal on at once to the man in the next signal-box ahead, called Hough Lane. It was a very foggy morning. The signalman at Hough Lane gave me "Line clear," and I then gave "Line clear" back to the signalman at Tyldesley No. 1 box, and I took off the main line home and distant signals. The line between No. 1 signal-box, past my box, to Hough Lane signal-box is worked on the permissive system, or station working system. Instead of the passenger train which I had expected, a coal train arrived along the up loop line about 9.56 or 9.57 a.m., and the driver told me that his train had to be shunted into one of the private sidings, as he had to return to Tyldesley for water. That train was then put into the sidings. I did not give "Line clear" back to Tyldesley for that coal train; it is not customary to do so for any trains that arrive by the loop and stop at Green's siding. The main line signals, home and distant, were not put to "danger" when the coal train arrived, as I was still expecting a passenger train to arrive. At about 10.12 I put the home and distant signals back to "danger," as I thought there must have been a mistake in the signalling, and that no passenger train was coming; and I then opened the points for the coal train engine to pass from the sidings to the down main line. I also signalled the light engine to Tyldesley No. 1 box, and had that signal acknowledged. I then showed the driver of the coal train a green flag, for him to proceed cautiously to Tyldesley. The driver obeyed the signal and crossed the road, and when he was crossing the diamond crossing of the up main line the

passenger train arrived on the up main line, and ran into the light engine at 10.15 a.m. The collision was the result of my having made a mistake as to the signal which was given to me from Tyldesley No. 1 signal-box at 9.48 a.m. I thought it was a signal for a passenger train, but when more than 20 minutes had elapsed without any passenger train arriving, I concluded that I had been mistaken in supposing that a signal for a passenger train had been given, and in consequence I put the signals on to "danger," and opened the points for the light engine to cross and go to Tyldesley for water.

James Watkinson, engine-driver 23 years, states: I was driving engine No. 2,001 on the morning of the 16th instant from Liverpool to Manchester. Mine was a tender engine, running with the engine in front, and seven vehicles, including breaks. That train was the 7.45 a.m. train from Liverpool. We stopped at Chowbent, and arrived at Tyldesley about 10.10 a.m. It was a very thick morning, so that I could not see more than the length of the engine. We left Tyldesley at 10.15 a.m. in the usual manner, and were travelling at about 20 miles an hour, when we ran into an engine which was crossing the line from the sidings opposite to Green's sidings signal-box, in order to get to the down main line. The home-signal worked from Green's siding signal-box was on at "danger" when I came up to it, but I could not see that signal until I was not more than the length of the engine from it, on account of the fog. I was still running at the same rate, but I had only time to shut off the steam, and the fireman had just got the tender break on, when the collision occurred. My engine was diverted to the slip road by the shock of the collision, but did not leave the rails altogether, and my tender followed the engine; the next carriage to the tender was partly thrown off the rails. I believe it remained on the main line. The chimney and smoke-box of my engine were damaged. I was hurt in the leg, and my fireman was shaken. I jumped off before the collision took place, about 10.17 a.m. The tender of the other engine was damaged. There were no other carriages in my train thrown off the rails.

Robert Myles, fireman to J. Watkinson, eight years a fireman, states: I confirm the driver's statement. I was hurt in the back and loins, and have been working in the sheds, but not acting as fireman since the collision occurred. I remained on the engine. There were no other carriages in our train thrown off the rails except the one next the tender.

George Jones, guard of the 7.45 a.m. passenger train from Liverpool to Manchester on the 16th instant, states: I was acting as extra guard, but have been eight years in the Company's service. My train consisted of engine and tender, two composites, one third, one first-class and one break-van, and one second-class carriage at the rear of the train. I rode in the break-van, the last vehicle but one in the train. We reached Tyldesley at 10.10 a.m., and left at 10.15. It was very foggy at that time. I heard a whistle from an engine, and was immediately knocked down. I was in a stooping position, taking a way-

bill off one of the parcels, and was knocked into the corner of the van, with my shoulder against the partition, and was hurt in the shoulder. I received a contusion. We were just going at a moderate pace, about 20 miles an hour at the time. I had no time to do anything. The composite carriage, 6-wheeled, next the tender, had the middle wheels off the rails they were on the up main line.

Jerome Wilson, engine-driver five years, and 12 altogether in the Company's service.—I was driving No. 203 engine and tender on the morning of the 16th instant, and at about quarter-past 10 o'clock I was in the sidings opposite to Green's sidings signal-box, waiting for the signalman to give me permission to cross from the sidings to the down main line. I had not been waiting long. We arrived there from Tyldesley along the goods line about 10.5 a.m., and we had to back our mineral train into the sidings,

and I was then ready to get across. We stood opposite to the signal-box about four or five minutes, and then the signalman opened the points for us to cross, and called me out with a green flag. I could not see the up home-signals on account of the fog. I started to cross, the tender being in front of the engine, and I was running about seven or eight miles an hour along the through-crossing road, when the tender came in contact with the engine of the 7.45 a.m. up passenger train from Liverpool. I first saw the other engine when it was rather better than the length of an engine from my engine. I had no time to do anything. The tender of my engine was thrown off the rails, but remained coupled to the engine, but my engine was not thrown off the rails. The tender was damaged. My mate and I had just jumped off the engine, when the collision took place. We were not hurt.

Conclusion.

From the preceding statements it appears that the signalman in No. 1, or the Tyldesley east signal-box, received a telegraphic signal from No. 2, or the north Tyldesley signal-box, for the 7.45 a.m. up passenger train from Liverpool to Manchester on the 16th December at 9.48 a.m., and he forwarded that signal to the next signal-box ahead, at Green's sidings, at 9.56 a.m. The signal was acknowledged, and the up signals were taken off by the signalman at Green's siding; and the starting-signal for the Tyldesley station was taken off for the train to proceed.

This passenger train consisted of an engine and tender, and six vehicles, including a break-van placed the last vehicle but one in the train. It did not reach Tyldesley station until 10.10 a.m., 14 minutes after the signalman had telegraphed it forward to Green's sidings, and it left at 10.14 a.m. according to the signalman, and at 10.15 a.m. according to the guard of the train.

There was a dense fog prevailing at the time, so that the signalman in No. 1 signal-box could not see as far as Tyldesley station, but he heard the passenger train arrive at the station at the time named.

This train proceeded on its way eastwards, and was travelling at about 20 miles an hour, when it ran into the tender of a light engine which was in the act of passing along the through-crossing, from the sidings opposite to Green's sidings signal-box to the down main line, in order to get back to Tyldesley for the purpose of taking water. The passenger train engine was diverted from the up main line to the slip road connecting it with the through-crossing line, and the carriage next to the tender was thrown off the rails, as well as the tender of the light engine.

According to the evidence of the signalman at Green's siding signal-box, this collision was brought about by his acts, and in the following manner:—

He says that at 9.48 a.m., and not at 9.56 a.m. as stated by the signalman at No. 1, or Tyldesley east signal-box, he received a telegraphic signal for what he believed to be a passenger train from No. 1 box, and he passed that signal on at once to Hough Lane signal-box ahead, and when the signalman at Hough Lane had given him "Line clear," he gave "Line clear" to the signalman at No. 1, or Tyldesley east signal-box, and took off the main line up home and distant signals.

Instead of a passenger train, a coal train arrived by the loop line about 9.56 or 9.57 a.m., and the driver told him that his train was to be shunted into one of the private sidings, and that he had to return to Tyldesley for water; and that coal train was at once put into the sidings.

The main up home and distant signals were not replaced at "danger" when the coal train arrived, as the signalman still expected a passenger train to arrive.

About 10.12 a.m. he put the up home and distant signals back to "danger," as he thought there must have been a mistake in the signalling, and that no passenger train was coming, and he then opened the points and signalled to the driver of the light engine which had placed the coal train in the sidings, and the driver obeyed the signal, put his engine in motion, and as it was crossing the up main line it was run into by the 7.45 a.m. up passenger train from Liverpool.

The signalman admits that the collision was caused by his mistake, as to the signal which was given to him from No. 1 Tyldesley east signal-box at 9.48 a.m. He thought then "it was a signal for a passenger train; but when more than 20 minutes had elapsed without any passenger train arriving, he concluded that he had been mistaken in supposing that a signal for a passenger train had been given, and in

“ consequence he put the signals on to ‘ danger ’ and opened the points for the light engine to cross and go to Tyldesley for water.”

The only rule in the Company’s Book of Regulations which appears to bear upon this case is the latter part of No. 151, page 69, which says: “ When a home-signal has been lowered for the passing of a train, it must not (except in case of accident or obstruction) be again placed at ‘ danger ’ until such train has been brought to a stand, or has passed within the home-signal.”

But it seems to me that “ train on line ” signals should not be given on from telegraph station to telegraph station so long a time in advance of the running of trains, especially during dense fogs, when another train could not be seen at much more than the length of an engine.

According to the signalman at No. 1, or the Tyldesley east signal-box, he sent the message on 14 minutes before the train actually reached Tyldesley station, where it remained five minutes. It would have been soon enough to have done so when the train was entering the station ; and this practice of sending on these messages so long in advance of the actual running of the trains is calculated very materially to impede and delay the working of the traffic.

It would also seem desirable that signalmen in similar cases should be specially instructed by distinct rules to block back to the last station, and have the signals properly acknowledged, before they attempt to do what was done by the signalman in this case, which led to a very severe collision, but fortunately was not attended by any serious results to the passengers or servants of the Company.

I have, &c.

The Secretary,
(Railway Department,) Board of Trade.

W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 23rd January.

LONDON AND NORTH-WESTERN AND GREAT WESTERN JOINT RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., November 21st, 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 15th instant, the result of my inquiry into the circumstances attending a collision which occurred on the 11th instant, near Shrewsbury, on the London and North-Western and Great Western Joint Railway.

In this case, as the 7.50 p.m. down Great Western passenger train from Wolverhampton to Chester, consisting of engine and tender, front break-van, four coaches, and rear break-van, was approaching Shrewsbury station, it came into collision, at about 8.51 p.m., with the tail of the 6.50 p.m. down London and North-Western passenger train from Stafford to Shrewsbury, consisting of engine and tender, six coaches, rear break-van, and horse-box, which was standing on the down line, with the engine, about 126 yards outside the stop signals at the Severn Bridge junction signal-box.

Two passengers, and the guard in the latter train, and one passenger in the former, were injured.

In the London and North-Western train the damages to the rolling stock were as follows :

Horse-box, end panels stove in, head-stock broken, buffer castings and buffers bent ; rear break-van, end panels stove in ; three leading carriages, buffer castings broken, and buffers bent ; fourth carriage, head-stock broken.

There was no damage to the Great Western train, or to the permanent way, and none of the vehicles were thrown off the rails.

The horse which was in the rear vehicle of the London and North-Western train was uninjured.

Description.

At Severn Bridge junction, about 250 yards south of the up end of Shrewsbury station, the joint line from Hereford, running from the south, joins the joint line

from Wellington, or the Salop line, running from the east. On approaching the junction, the latter line is straight from Potteries junction cabin to Abbey Foregate junction cabin, a distance of 825 yards, and for about 60 yards beyond it, is then on a curve to the south of 22 chains radius for 165 yards, and then on a reverse curve to the north of 10 chains radius for 240 yards up to the junction.

The distance between Abbey Foregate junction and Severn Bridge junction is 467 yards, and there are sidings on both sides of the line for the whole of this distance.

The line falls on a gradient of 1 in 180 from Potteries junction nearly up to Abbey Foregate junction, and is then level up to and beyond Severn Bridge junction.

The tail of the London and North-Western train at the time of the collision was about 222 yards from Severn Bridge junction cabin, the whole train standing on the 10-chain curve.

The home-signals at this junction are not divided, but are situated close to the cabin, and the engine of the London and North-Western train was standing just short of the fouling point of a siding junction on the down line, 126 yards from the cabin, where would be the proper position for the down home-signal.

The Salop line is worked on the block system only up to Abbey Foregate cabin, whence into the station there is station yard working.

There is no down distant-signal for Severn Bridge junction on the Salop line, but there is a disc worked from this cabin in Abbey Foregate cabin, the lever actuating which is however not interlocked with any of the signal or point levers.

The engine of the Great Western train was a 4-wheel coupled tender engine, with a 6-wheeled tender having one break block on each wheel.

The following is the regulation for the working of down trains between these two boxes.

“ DOWN TRAINS.

“ *Abbey Foregate to Severn Bridge Junction.*

“ All trains and engines proceeding in the direction of Severn Bridge junction will be signalled from Abbey Foregate to Severn Bridge junction as follows :

“ Code No. 1, for passenger train, one beat on gong.

“ Code No. 2, for empty engine, two beats on gong.

“ Code No. 3, for goods train, three beats on gong.

“ When the line is clear the ‘line clear’ disc will be given in answer to the signal, and the train or engine may be allowed to proceed, but if the line is blocked the ‘line blocked’ disc will be shown, and the train or engine must be brought to a stand, and the driver instructed to proceed cautiously.”

Evidence.

William Hayward, signalman 12 years, states.—I am a signalman at the Abbey Foregate junction signal-box. I have been at this box for about 12 years. On the 11th instant I signalled the London and North-Western 3.0 p.m. train from Euston to Severn Bridge junction at 8.39 p.m. I did not obtain “Line clear” from Severn Bridge, and therefore kept my signals up, until the train came almost to a stand, when I dropped them, and cautioned the driver past with a green light, and told him to “Look out down below,” to which he replied “All right.” At this time I had the Great Western 8.30 p.m. coal train on the up main line, the London and North-Western 8.40 p.m. goods train on the Shropshire union siding, and the Great Western down sidings were full of horse-boxes and coaches, which prevented my seeing if the line was clear or not. The Great Western 8.30 p.m. passenger train from Paddington was signalled to me from Potteries junction at 8.49 p.m. and I sent the signal on to Severn Bridge at that time, and at once got “Line clear.” I lowered my signals and allowed the train to proceed. Just as the Great Western train was passing my box, the “Line clear” disc from Severn Bridge was put back to “Line blocked,” but, between this operation and the train passing my box, I had not time to get to the window to show a green light to the driver. It was a stormy night. The Great Western train was running about 13 or 14 miles

an hour past my box, but not any faster than usual. When I gonged the London and North-Western train to Severn Bridge junction at 8.39 p.m. I got no reply. I gonged again at 8.42 p.m., when the train proceeded.

James Watkins, signalman 20 years, states.—I am a signalman at the Severn Bridge junction signal-box, Shrewsbury, and have been in this position for nearly 20 years. On the 11th instant I came on duty at 2 o’clock, and left at 10 p.m., these being my ordinary hours. At about 7.55 p.m., a London and North-Western Stafford passenger train passed my box in the direction of the station, and this was followed by another passenger train from the Stafford line at 8.23 p.m. and this train was targetted for a “Special to follow.” The next signal I had from Abbey Foregate was one for the Great Western train, due in Shrewsbury at 8.42 p.m. This signal I received about 8.50 p.m., and I at once gave “Line clear,” and lowered my home-signal. I did not know that the London and North-Western train was standing some little distance from my box, until Mr. Patchett walked down to me from the train, and told me it had been standing there several minutes. At this time the “Line clear” disc had been given to Abbey Foregate for the Great Western train, but I at once reversed it, and immediately afterwards I heard the Great Western

engine being reversed, and the collision occurred. My home-signal was lowered for the Great Western train at about 8.51 p.m. I am positive that I had no other signal besides the one I have already mentioned given to me from Abbey Foregate. I could not see the London and North-Western train where it stood from my box, neither did I hear any train from the Wellington line whistle to come off. My home-signal had been at "All right" at the least two or three minutes before the collision occurred. It was a thick night.

George Crutchley states.—I am a driver in the employ of the Great Western Railway Company. I have been in the service about 25 years, and have been a driver for upwards of 18 years. I was driving the 7.50 p.m. passenger train from Wolverhampton to Chester on the 11th instant, and when approaching Wellington a London and North-Western train got in front of us and we were delayed about four minutes. After we left Wellington at 8.35, seven minutes late, the signals were at "All right" into Shrewsbury. The signals at Abbey Foregate were at "All right," and the first intimation that I had of a train being in front of me at Severn Bridge was a signal I received from the driver of the Wolverhampton goods, which was standing on the up main line. He called out to me "Steady up," and put out his hand. On hearing him call out I leaned over the side of the hand railing, and upon looking out I could see the tail lamp of a train just in front of me. My steam was off, and I reversed my engine and did all I possibly could to stop, but the distance being only about 50 yards, was not sufficient to enable me to do so to prevent the collision. The main line signal at Severn Bridge stood at "All right," and receiving no "Caution" signal when passing Abbey Foregate I assumed that it had been lowered for me to pass. I passed Abbey Foregate at my usual speed, about 17 or 18 miles an hour, but I had reduced to about 10 miles an hour when the collision occurred. The shock was not much. I remained on my engine and was not knocked over. There was no damage to my engine or train and no vehicles were thrown off the rails. The London and North-Western train was just moving ahead when I struck it. It was a clear but stormy night and the rails were greasy. My engine is a 4-wheel coupled engine with a 6-wheeled tender, having one break block in each wheel. My fireman applied the tender break, but I had no time to whistle for the guard's break.

Edmund Batkin states.—I have been in the employ of the London and North-Western Company for 14 years and am classed as an extra driver. I was the driver of the 3 p.m. passenger train from Euston on the 11th instant. We left Stafford at 7.35 p.m. Everything went on all right until we arrived at Shrewsbury, but when approaching Abbey Foregate

at about 8.40 p.m., the signals were on. I drew down to the signal and it was lowered, and I was called past by a green light shown by the signalman, who called out to me to draw down steadily, to which I replied "All right." We were pulled up outside Severn Bridge junction, and stood there four or five minutes. I then whistled for the signal, and after standing about five minutes longer it was lowered. I put on steam, but had some difficulty in starting as my engine was very slow to start. We had not gone above five or six yards when the collision occurred. From the time the signal was lowered until I moved my train was about one minute. My engine was a single-wheeled 7 feet 6 inch passenger engine. The shock of the collision applied the patent break, and this prevented the train from again moving. I cannot say positively that this was the case, or whether the wheels of one of the vehicles in the train being knocked off the road caused the break to bind and prevented my engine from moving the train. I had travelled four or five yards with my train, but immediately the bump took place my train came to a stand. I originally stopped 126 yards away from the signal, because my instructions are when approaching a junction not to foul any sidings near to that junction. We were 40 minutes late in leaving Stafford, owing to the race meeting. We left Wellington at 8.24 p.m., 47 minutes late. My train consisted of engine and tender, six coaches, rear van, and horse-box. The three rear coaches and van were fitted with chain break. I had two head lights on my engine, and I am sure they were lighted. I could see the signal-box from my engine.

Arthur Harris states.—I am a driver in the employ of the Great Western Railway Company. I have been in the employ of this company for 20 years, 14 years as a driver. I was the driver of the 4.40 p.m. coal train, Wheatsheaf to Wolverhampton, on the 11th instant. Everything went on all right until we arrived at Abbey Foregate. We were stopped by the signals at Abbey Foregate. Just as I came to a stand, on the station side of the stop-signal I observed a Great Western passenger train coming down from the direction of Wellington. I tried to get my gauge lamp to show the driver of this train a red light to bring him to a stand, as I saw a London and North-Western passenger train standing between Abbey Foregate and Severn Bridge junction. I knocked my lamp down in endeavouring to get it, and I then shouted to the driver of the passenger train, and immediately afterwards I thought I heard the engine being reversed. The distance from the place where I stood to the point of collision would, I should think, be about 70 or 80 yards. I could not see the train coming before because I had my own signals to attend to, and this prevented my hearing or seeing it approaching. The Great Western train had steam off.

Conclusion.

This accident was due to a mistake of one or other of the two signalmen in Abbey Foregate and Severn Bridge junction signal-boxes, but the statements of the two men are so diametrically opposed to each other, that, in the absence of any positive evidence in support of either of their versions of what occurred, it can only be a matter of surmise as to which of them is to blame.

The signalman in Abbey Foregate signal-box states, and his statement is borne out by his register, that he signalled on the London and North-Western train to Severn Bridge junction in the proper manner, having brought it to a stand at his down home-signal, and sent it on with a "Caution," because the disc in his box, worked from Severn Bridge junction, had not been turned to "Line clear," while the signalman in the latter box denies that he received any signal whatever for this train, which was, therefore, kept standing outside the junction unknown to him, until the superintendent of the line, who happened to be in this train, went forward and told him it was there.

He had at this time given "Line clear" for the Great Western train to approach,

and although he at once lowered his signals for the London and North-Western train to come on, and blocked the line back, it was too late for the signalman in Abbey Foregate box to stop the Great Western train by his signals, or for the London and North-Western train to do more than move ahead a few yards before it was run into.

Owing to the sidings on both sides of the line being full, the head lights of the engine of the London and North-Western train were not visible from the Severn Bridge Junction signal-box, nor was the tail of this train visible from the approaching Great Western engine for more than 50 or 60 yards, and the driver of this engine was therefore unable to do more than reduce his speed to 10 miles an hour before the collision occurred.

I do not think that any blame can be attached to either of the drivers, although the driver of the London and North-Western train might with advantage have whistled more than once for the signal, knowing, as he must have done, that he was some distance from the signal-box, and the view of the line was obstructed by the vehicles on the sidings.

His explanation that he stopped 126 yards short of the home-signal, so as to avoid fouling the siding junction, is satisfactory.

There were several special trains running on the evening of the accident, on account of the Shrewsbury race meeting, and the probable explanation of the mistake which occurred is that the signalman at Severn Bridge junction, in consequence of these additional trains, forgot that he had received any signal for the London and North-Western train, and that he is therefore the one responsible for the accident. This is the more probable because he has in his signal-box no register of trains, the booking of which cannot fail to be of great assistance to signalmen in remembering what signals they receive. It is most desirable that all signal-boxes should be furnished with these registers, and instructions should be given that one should be properly kept in Severn Bridge junction box. I would also recommend that this junction should be provided with a down distant-signal on the line from Wellington, for it is not in its present state sufficiently protected by signals. This signal might be worked by the same lever which now works the disc in Abbey Foregate box. An addition should be made to the instructions to the signalmen in these two boxes, to the effect that all gong signals should be repeated, until they are acknowledged by a similar number of beats being returned.

The Great Western train was not fitted with continuous breaks, as all passenger trains should be, but even if it had been so fitted the collision in this case would probably not have been prevented, for the benefit arising from their use would simply have counteracted the higher rate of speed at which the train would probably have been running.

I have, &c.,

*The Secretary,
(Railway Department),
Board of Trade.*

F. A. MARINDIN,
Major R.E.

Printed copies of the above report were sent to the London and North-Western and the Great Western Railway Companies on the 16th January.

LONDON, BRIGHTON, AND SOUTH COAST RAILWAY.

Board of Trade (Railway Department),
13, Downing Street, Whitehall, London, S.W.,
25th November 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 11th instant, the result of my inquiry into the circumstances connected with the collision that occurred on the 2nd instant, between two passenger trains, at the York Road station of the London, Brighton, and South Coast Railway Company's high level line.

Eighteen passengers are returned as having been injured on this occasion.

The damage to the rolling stock is stated to have been very slight.

The collision occurred at the south side of York Road station, which is distant about 1,408 yards from Pouparts junction.

There are three lines of railway at this station, one down and two up lines, and the collision occurred on the middle or up local line, between the 6.20 p.m. up train from West Croydon and the 6.21 p.m. up train from South Croydon.

The signal-box at York Road station is situated at the north end of the station, and about 75 yards from the up starting-signal; and the up home-signal, referred to in the evidence as the rear signal, is 218 yards south of the starting-signal, and about 85 yards south of the up platform. The signalman cannot see a train which is stopped at the home-signal from the signal-box. There is also an up distant-signal 660 yards south of the up home-signal; so that the up lines at the York Road station are properly protected. The traffic is worked on the absolute block system, by which no two up trains, on the same line, are permitted by the regulations to be on the length between Pouparts junction and York Road station at one and the same time.

The evidence is as follows :—

John Buckland, engine-driver of 6.20 p.m. train, from West Croydon to Victoria, engine No. 188, states :—On approaching Pouparts junction the distant-signal was on, and the semaphore-signal off. We did not stop at Pouparts junction. On approaching York Road station I found both distant and rear signals on. We stopped at the rear-signal two or three minutes; the signal was then lowered, and we pulled up to the platform. Almost directly after we had pulled up, I felt something strike the back of the train. This occurred a little after 7 o'clock. I don't know whether my train had tail lights on or not. The starting-signal was also lowered as we were pulling into the platform. I felt but very little jerk when the collision took place. Our break was off, and I suppose it moved our train forward about half a carriage length. The guard went back to see what it was, and he told me it was the South Croydon train that struck ours behind. I have been in the service 28 years, and been driver about 16 years. We went on immediately afterwards as soon as the passengers had got in. One glass was broken.

F. Day, fireman to driver J. Buckland, driver of 6.20 p.m. train, West Croydon to Victoria, 2nd inst., states :—On approaching Pouparts junction the signals were clear, but on nearing York Road station the distant and rear signals were both on. We stopped at the rear-signal about three minutes; the signal was then lowered, and we pulled into the platform. As soon as we stopped at the platform the other train ran into ours. The starting-signal was pulled off as we pulled up at the platform. We only just felt the jar of the collision; it was very slight.

William Grover, head-guard of the 6.20 p.m. West Croydon to Victoria train on the 2nd inst., states :—My train consisted of tender, engine, and 11 vehicles, including two third-class break-carriages. We left West Croydon one minute late; were delayed five minutes at St. James's junction by Brighton train up from East Croydon; we stopped two minutes extra at Norbury to take up passengers from Streatham races; stopped again at Balham junction two minutes; checked again by signals at New Wandsworth. On approaching Clapham junction the signals were against us; after passing the distant-signal, found the stop-signal off. We left Clapham junction at about 6.55½, and on approaching Pouparts junction found the distant-signal was on; the driver whistled, and as soon as we got abreast of the distant-signal the junction-signal was taken off. We ran on to York Road, and found the distant-signal on; the driver drew gently up to the stop-signal, where we stood nearly three minutes, when the signal was lowered, and we drew into the station; the time by my watch being 7.3 p.m. when we stopped at the station. I had just got out on the platform, and put a passenger's basket in my break, when I felt the other train come into ours. I could not say positively when the starting-signal at York Road was lowered. There was a tail light on the last vehicle, a break-carriage, which showed a

good light; it was placed on the near side of the carriage next to the platform. The last carriage had stopped nearly opposite the south end of the platform. I went back after the collision had occurred, and found that the light was still burning, and showing a red light; the glass was not broken. There was no vehicle off the road.

James Wood, under-guard of the 6.20 p.m. train from West Croydon to Victoria on the 2nd inst., states :—After leaving Clapham junction I saw that Pouparts distant-signal was on; after the train had pulled up, and we had come past Pouparts junction, I saw the York Road distant-signal was on, and we stopped outside the rear-signal about two minutes. The signal was then pulled off, and we drew into the platform, and I had just got out on to the platform when the following train ran into my break. The tail lamp was burning properly on my break. I rode in the last vehicle. I did not notice the state of the starting-signal at York Road. I did not see the other train coming before the collision took place. Two panes of glass were broken in the windows of the rear break-carriage.

E. McKew, driver of the 6.21 p.m. South Croydon to Victoria train on the 2nd inst., states :—On approaching Balham junction the signals were all off; we stopped at the station. On approaching Wandsworth Common I found the distant-signal against me, and also the home-signal; the rear-signal was lowered for me to enter the station, and the starting-signal was pulled off while we stood at the platform. Proceeding to New Wandsworth station, the distant and rear signals were against me, but were lowered as we approached. Running on to Clapham junction, I found the distant-signals on, and whistled, but when sighting the rear and starting signals they were both off. We stopped at the station, then proceeded on to Pouparts junction, and I found the distant and home signals off. We ran past, on to York Road, and I found both the distant and rear signals off; they were off when I first sighted them; but on approaching the station I saw a tail lamp on the end of a train, as I supposed, and called out to my mate "Whoa!" and I immediately reversed my engine and did all I could to stop, which I very nearly did before striking the train. I had no time to whistle for the breaks. I first saw the tail lamp when about 50 yards from it. We did not strike the train hard, only just touched it. The passengers in my train did not appear to know I had struck anything, the shock being so slight. I have been in the service 13 years, and have been driving about three years. I think I might be running about two miles an hour when the collision took place.

William Smith, fireman to driver E. McKew working the 6.21 p.m. South Croydon to Victoria train on the 2nd inst., states :—I am not positive, but I believe the Balham signals were all off. After leaving that station and approaching Wandsworth Common,

the stop-signal was pulled off as we approached, and both rear and starting signals were clear. On approaching Clapham junction all signals were off. We stopped at the station. On approaching Pouparts junction we found all signals off, and ran past, and on approaching York Road we found both distant and rear signals off when we first saw them. I did not notice the position of the starting-signal. After passing the rear-signal I saw the tail lamp of a train about 50 yards in front. My mate called out "Whoa!" and I put my break on and did the best to stop, the driver reversing his engine. Our train seemed to stop very quickly, and did not strike the other train very hard. Ours was a tank engine, running with the chimney behind. There was no damage done to the engine.

William Beauchamp, head-guard of the 6.21 p.m. South Croydon to Victoria train on the 2nd inst., states:—

We left South Croydon at 6.21 p.m.

Arrived at New Croydon	at 6.24 p.m.,	dep. 6.26 p.m.
" NorwoodJunc.,	6.30 "	" 6.31 "
" C. Palace	" 6.36 "	" 6.38 "
" Gipsy Hill	" 6.40 "	" 6.41 "
" LowerNorwood,,	6.43 "	" 6.44 "
" StreathamHill	" 6.48 "	" 6.49 "

On approaching Balham we found all signals were off. Arrived there at 6.51, and away 6.52, one minute late. I rode in the front third-class break carriage. On approaching Wandsworth Common we found the distant-signal on. The driver whistled, and just before reaching the rear stop-signal it was taken off. Arrived at Wandsworth Common at 6.55 p.m., and away at 6.56, two minutes late. The starting-signal was on until we were ready to start, when it was taken off. On approaching New Wandsworth the distant-signal was against us. The driver whistled, and the signal was taken off. The signals were then clear till we approached Clapham junction, where the distant-signal was on. The driver whistled, and the rear-signal was taken off as we approached. We arrived at Clapham junction at 6.59 p.m.; left at 7.0 p.m. The starting-signal was all right when we entered the station. On approaching Pouparts junction all signals were off for us, as also was the York Road rear and starting signals. I did not notice the train in front; the engine took off the sight, as it was one of the old birdcage breaks. I applied my break in the usual manner to pull up at the platform. I only just felt our train strike the other. My break was hard on at the time. The collision occurred at 7.4 p.m., which was one minute late. Our train was not damaged, nor were there any complaints from any of the passengers. We were not running more than two or three miles an hour when the collision took place.

Frederick Knight, under-guard of the 6.21 p.m. South Croydon to Victoria train on the 2nd inst., states:—On approaching Balham junction we found the signals all off. Leaving that station, and on nearing Wandsworth Common, found the distant and rear signals on; the driver whistled, and the rear-signal was lowered. The train pulled into the platform, and the starting-signal was lowered when we were ready to leave. At New Wandsworth the distant and rear signals were both on; the driver whistled, and both signals were lowered together. On approaching Clapham junction the distant-signal was on and the rear and starting signals off. Leaving that station, we found both signals right at Pouparts junction; ran past, and on approaching York Road found both the distant and rear signals off. I saw the starting-signal was off as we were approaching, and just as we were passing the rear-signal I was looking out of the window of my break and saw the tail lamp of a train standing at the platform. I was in the last vehicle. I had my break already on, to pull up at the station.

I then put it on as tight as I could. We ran into the tail of the other train at about two or three miles an hour; but there was scarcely any rebound to ours. I scarcely felt the collision.

George Ross, signalman, Pouparts junction, states:—I observed nothing unusual in the working of the traffic between 6.49 and 7.10, and I performed my duties in the ordinary manner; but at 7 p.m. I received the block signal from York Road, which was continued until 7.12 p.m., and then York Road cleared and the traffic went on in the usual way. I received a train out from Clapham junction north box at 6.49 p.m. on the local line. I cleared it back to Clapham junction north box at 6.52 p.m. I gave it on to York Road at the same time, 6.52 p.m., and I received clear signal from York Road at 6.55. At 6.52 I received a signal from Clapham junction north box, three twos on the main line, as a signal for Battersea Yard. I pulled off my distant and home signals for Battersea Yard low level line. Finding the train did not come as it ought to have done, I called Clapham junction north box, but could not gain attention. The driver of an engine on the main line found I did not alter the signals for him, drew up to the box and stated he wanted to go to Victoria. Engine on main line given on to York Road at 6.57 p.m.; received clear back for that engine at 6.59. This engine ought to have been signalled out from Clapham junction with two rings instead of being signalled to me by three twos—two beats of a bell given to me three times. At 6.54 I received a signal from Clapham junction north box for a train on the local line, and I gave on to York Road at 6.57. I cleared back to Clapham junction at the same time. I received the clear signal from York Road at 6.59. This train is booked as a Crystal Palace train; but it should be a West Croydon train. At 6.59 p.m. I received a signal from Clapham junction north box for another train on the local line for Victoria. I gave it on to York Road at 7.2, and I cleared it back to Clapham junction north at the same time, and received the clear signal from York Road at 7.9. This train is booked as a West Croydon train; it should be South Croydon. At 6.59 I received a signal from Clapham junction, north, for a train on the main line for Victoria. I gave it on to York Road at 7.2 p.m. and cleared it back to Clapham junction at same time, and received clear signal from York Road at 7.4 p.m. The next signal I received for an up train from Clapham junction north box was at 7.7 p.m. on the main line, given on to York Road at 7.11; cleared back to Clapham junction north at 7.11, and received clear signal back from York Road for that train at 7.14 p.m. At 7.10 p.m. I received a block signal from York Road for the up local line, which was again cleared at 7.12 p.m. I was not aware that anything irregular had occurred in the working of the traffic until half-past 8, when Mr. Mead and Mr. Carne came to my signal box to make inquiries. These trains were booked by my signal clerk up to the figures 7.4 p.m., after which the booking was done by myself. I worked the instruments myself for the trains. I came on duty at 2 p.m. that day, and was released at 9 p.m. I have been eight years in the service, and a signalman about seven years. I first commenced as signal porter at Wapping, and was removed from there to Streatham Hill; from Streatham Hill to Wandsworth Common, and from the latter station to Pouparts junction, where I have been about five months.

Allan Watkins, train signal clerk, Pouparts junction, states:—I made all the entries in the signal book up to 7.7 on the night of the 2nd inst. At 6.49 p.m. I booked a signal for a train on the local line from Clapham junction north box, and I cleared it back at 6.52; it was given on to York Road at the same time, and cleared back from York Road junction at 6.55 p.m. The next signal I booked from Clapham junction north was for an engine on

the main line at 6.52; cleared it back to Clapham junction north at 6.57. I signalled it out to York Road at the same time, and the clear signal was received from York Road at 6.59 p.m. The next signal I booked from Clapham junction was for a train on the local line at 6.54; cleared back to Clapham junction north at 6.57; signalled out to York Road at same time; clear signal received from York Road at 6.59 p.m. The next signal I booked from Clapham junction north box was for a train on the local line at 6.59; it was cleared back at 7.2 p.m., and given on to York Road at 7.2 p.m., and cleared back from York Road at 7.9 p.m. The next signal I booked from Clapham junction was for a train from Brighton, on the main line, at 6.59 p.m.; it was cleared back to Clapham junction north at 7.2, and signalled on to York Road at the same time, 7.2, and the clear signal from York Road was received at 7.4. After entering the signal at 7.7 p.m. I went home, as I finished my day's work at 7¹/₂ p.m. I am quite certain that York Road junction accepted the signal given to him at 6.57, and that he cleared it at 6.59 p.m. I observed also that York Road would not accept the signal "train on line" until it had been given out about three times. I have been in the Company's service about six months, and at Pouparts junction the whole time.

LONDON, BRIGHTON, AND SOUTH COAST RAILWAY.

TRAIN SIGNAL BOOK.

Pouparts Junction Station, Saturday, 2nd day of
November 1878.

UP TRAINS.

Description of Train.	Signal received from	Signalled to	Signalled to	Signal received from	Remarks.
	CLAPHAM JUNC. that Train had left.	CLAPHAM JUNC. that Train had arrived.	YORK ROAD that Train had left.	YORK ROAD that Train had arrived.	
O. P. - -	H. M. 6 49	H. M. 6 53	H. M. 6 52	H. M. 6 55	Given in with 3 twos.
Engine, Vic. -	6 52	6 57	6 57	6 59	
*C. P. - -	6 54	6 57	6 57	6 59	
†W. C. - -	6 59	7 2	7 2	7 9	
Bton. - -	6 59	7 2	7 2	7 4	
Sutton - -	7 7	7 11	7 11	7 14	

* Note.—These entries refer to the 6.30 p.m. up passenger train from West Croydon.

† These entries refer to the 6.21 p.m. up passenger train from South Croydon.

Henry Haybittle, signalman at the York Road junction box, states:—At 6.53 I received a signal from Pouparts junction for a Crystal Palace train on the local line, which I acknowledged; the train arrived, and I gave the clear signal back to Pouparts junction at 6.56. This train was signalled by me to Battersea Pier junction at 6.55, and the clear signal received at 6.59. At 6.58 I received a signal from Pouparts junction for an engine on the main line; I cleared it at 7 p.m. This engine was signalled by me to Battersea Pier at 6.58, and clear signal received from there at 7.1 p.m.

The next train shown in my book as given out from Pouparts junction on the local line at 6.59 p.m., and that it was cleared back at 7.2 p.m., and it also appears in my book as given out to Battersea Pier at 7.1 p.m., and cleared back at 7.3 p.m. I have no knowledge whatever of this train, and my clerk must

have booked it without my authority. I was not out of my box at all about this time.

At 7.3 p.m. I received a signal from Pouparts junction of an up train out on the local line, which I acknowledged and pulled off my signals, not knowing at the time that there was a train standing at my rear signals. The West Croydon train must have been standing at my signals at the time. This train that was given out from Pouparts junction at 7.3 I signalled out to Battersea Pier at 7.5, and which was cleared back at 7.12; but after the train had left the platform I saw a train still there, and I gave the block signal to Pouparts junction at 7.11 p.m., and cleared again at 7.14 p.m. The Pullman train, 5.45 p.m. from Brighton, was given out from Pouparts junction at 7.3, given on by me to Battersea Pier at the same time, and cleared back to Pouparts junction at 7.5 p.m., and cleared from Battersea Pier at 7.8 p.m. I came on duty at 2 p.m. and left at 9 p.m. I have been 16 or 17 years in the service, and about 12 years as signalman, and have been in the York Road signal box between eight and nine years. I work the train signalling instruments myself, and do not allow my clerk to work them or the levers. I never allow my clerk to book clear signals without my instructions.

The previous train to that received from Pouparts junction at 7.3 p.m. was the up Crystal Palace train at 6.53, signalled back to Pouparts junction at 6.56, and forward to Battersea Pier at 6.55, and line clear received for it at 6.59.

William Keat, train signal clerk, York Road junction, states:—The following entries were made by me from my observations of the working of the instruments. A train given on from Pouparts junction at 6.53 p.m. on the local line was signalled to Battersea Pier at 6.55 p.m., and cleared back to Pouparts junction at 6.56, and cleared back from Battersea Pier at 6.59. At 6.58 p.m. an engine was given on from Pouparts junction on the up main line, given on to Battersea Pier at 6.58 p.m., and cleared back to Pouparts junction at 7 p.m.; the clear signal was received from Battersea Pier at 7.1 p.m.

I made an entry of Crystal Palace train 5.53 p.m. from London as being given out from Pouparts junction at 6.59, and given on to Battersea Pier at 7.1 p.m., that it cleared back to Pouparts junction at 7.2, and the clear signal received from Battersea Pier at 7.3 p.m. This entry must be a mistake of mine, as I was putting some coals on the fire, and as I thought I heard the local instrument ring, and after I had done putting coal on the fire, I looked and saw the station was clear, and saw the Battersea Pier "In" signalling instrument for the local line was clear, I concluded that the train had passed and I had not seen it.

The next entry I made was a train given on from Pouparts junction on the local line at 7.3 p.m., given on to Battersea Pier at 7.5 p.m., cleared back to Pouparts junction 7.10 p.m., cleared from Battersea Pier at 7.12 p.m. The next entry is the 5.45 p.m. from Brighton, given out from Pouparts junction on the main line at 7.3 p.m., given on to Battersea Pier at 7.3 p.m., cleared back to Pouparts junction at 7.5 p.m., and clear signal received from Battersea Pier at 7.8 p.m. At 7.11 p.m. the local line was blocked to Pouparts junction, and cleared again at 7.14 p.m. I never work any of the levers, but I have occasionally worked the instruments, if the signalman goes outside the box. I have worked when the signalman has told me to do so. I never touched the instruments about that time.

LONDON, BRIGHTON, AND SOUTH COAST RAILWAY.

TRAIN SIGNAL BOOK.

York Road Station, Saturday, 2nd day of November 1878.

IN TRAINS.

Description of Train.	Signal received from POUPARTS JUNCTION that Train had left or passed.	Signalled to that Train had arrived.	Signal received from STATION SIGNALS that Train is approaching.	Line cleared to	Signal received from WANDSWORTH ROAD. that Train had left or passed and line blocked.	Signalled to that Train had arrived and line blocked.	Signalled to BATTERSEA that Train had left or passed.	Signal received from PIER JUNC. that Train had arrived.	Remarks.
C. P. - -	H. M. 6 53	H. M. 6 56	H. M. —	H. M. —	H. M. —	H. M. —	H. M. 6 55	H. M. 6 59	
S. P. (Engine)	6 58	7 0	—	—	—	—	6 58	7 1	
C. P. 5.53 - -	6 59	7 2	—	—	—	—	7 1	7 3	x x
W. C. 6.20 - -	7 .3	7 10	—	—	—	—	7 5	7 12	
Bton. 5.45 - -	7 3	7 5	—	—	—	—	7 3	7 8	
S.L. 6.35 - -	—	—	7 10	7 15	7 17	—	7 19	7 24	
Blocked Local to Pouparts Junction at 7.11; cleared at 7.14.									
S.C. - -	N.	S.	—	—	—	—	7 12	7 18	
A.M. 5.45 - -	7 12	7 14	—	—	—	—	7 12	7 15	

From the preceding statements it appears that the 6.20 p.m. up passenger train from West Croydon to Victoria station, which consisted of an engine and tender and eleven vehicles, including two third-class carriage breaks, passed Pouparts junction without being stopped by the signals; the signalman (Geo. Ross) stating that he had received a signal from Clapham junction north box for an up train on the local line at 6.54 p.m., had telegraphed it forward to York Road at 6.57 p.m., and had cleared it back to Clapham junction at the same time; and further that he had received a signal from York Road signal-box that this train had arrived at 6.59 p.m. These signals have reference to the 6.20 p.m. up passenger train from West Croydon, and the servants of the Company with this train state that on approaching York Road station they found the distant and home (or rear) signals, worked from the York Road signal-box, on at "danger" against them, and the train was drawn up and stopped at the rear-signal two or three minutes, and then the rear-signal was taken off, and the train was drawn ahead into the station and alongside of the up platform, and got there, according to the guard, at 7.3 p.m.

Entries nearly corresponding with the times which I have stated, copied from the entries in the Pouparts junction "train signal book," are found in the York Road "train signal book;" but the signalman in the York Road signal-box states that he has no knowledge of any such train, and that the telegraph clerk must have booked it without his authority. He also states that he received a telegraphic signal from Pouparts junction for an up train on the local line at 7.3 p.m., which he acknowledged, and pulled off his signals for it, not knowing at the time that there was a train standing at his rear-signals.

The result of this mistake in the telegraphic signalling for the absolute block system was, that when the York Road signalman pulled off his signals, the 6.20 p.m. up passenger train from West Croydon to Victoria station, which had stopped at the York Road station up rear-signals, then started and drew up alongside the station platform. The 6.21 p.m. up passenger train from South Croydon to Victoria, which consisted of an engine and ten vehicles, including two break carriages, passed Pouparts junction also without stopping, on finding the signals at "all right" for proceeding to York Road station; and the engine-driver and fireman of this train both state that the up distant and rear signals, worked from the York Road station signal-box, were both off when they first came in sight of them, and their testimony is confirmed on all sides, that the signals were off as they ran up to the York Road station platform. The driver, however, states that he first saw the tail light on the last vehicle of the 6.20 p.m. up train from West Croydon, which had drawn ahead into the station and was standing alongside of the up platform, when he was about 50 yards from the tail of that train, and then he reversed his engine, called out to his mate (who put on the engine break), and did all in his power to stop, but he had not time to whistle for the breaks. It is stated that the guard's breaks were on at the time for the purpose of stopping at the station, and it is said that the speed did not exceed two or three miles an hour when the collision took place about 7.4 p.m.

The driver of the 6.21 p.m. was evidently misled by finding the signals at "all right" for the train to enter the station, when there was a train standing at the platform; but if he had been keeping a better look-out ahead the tail lamp in the last vehicle of the 6.20 p.m. up train from West Croydon might have been seen at a distance of 175 yards, which distance would probably have been sufficient to have enabled him to have pulled up with the means placed at his disposal, and which would certainly have been enough if the train had been fitted with continuous breaks placed under his control.

The discrepancy in the statements of the signalmen at Pouparts junction and at York Road station cannot be cleared up. It is true that the clerk who entered the times in the telegraph "signal book" at the York Road station (W. Kent) states, "I made an entry of Crystal Palace train 5.53 p.m. for London, as being given out from Pouparts junction at 6.59, and given on to Battersea Pier at 7.1 p.m., that it cleared back to Pouparts junction at 7.2, and the clear signal received from Battersea Pier at 7.3 p.m. This entry must be a mistake of mine, as I was putting some coals on the fire, and as I thought I heard the local instrument ring, and after I had done putting coal on the fire, I looked and saw the station was clear, and saw the Battersea Pier 'In' signalling instrument for the local line was clear, I concluded that the train had passed and I had not seen it."

I should mention that there are no entries in the Battersea Pier "train signalling book" that will in any way support or corroborate the entries in the York Road "train signalling book" marked with crosses; but it is remarkable that the entries in this book which refer to the telegraphic signals between York Road and Pouparts junction correspond precisely, as regards the times, with those entered at Pouparts junction, and showing a difference in the clocks of one minute.

This would be an extraordinary coincidence if no signals at all had been received at the York Road signal-box from the Pouparts junction signal-box for the 6.20 p.m. up passenger train from West Croydon.

I am unable to state positively where the error was committed, but it seems to me far more probable that it arose at York Road station than at Pouparts junction signal-box.

The only remedy that I know of that will prevent such mistakes from occurring would be the adoption of the interlocking of the points and signals with the telegraphic instruments for working the block system, and causing the train itself to perform a part of the operation.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 11th December 1878.

LONDON, CHATHAM, AND DOVER RAILWAY.

Board of Trade (Railway Department),
13, Downing Street, London, S.W.,
4th September 1878.

SIR,

IN compliance with the instructions contained in the order of the 2nd instant, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances connected with the collision that occurred on the 31st ultimo, at the east end of the Sittingbourne station of the London, Chatham, and Dover Railway.

Five persons were killed, and about forty have complained of injuries, more or less severe.

On the day in question, the train, which is called the "cheap fast up," ran in two parts. The second portion, which was timed to leave Ramsgate at 11.30 a.m., ran into some goods waggons which were being shunted at Sittingbourne.

The train consisted of an engine and tender, 11 passenger coaches, one luggage van, and two break-vans.

Four wheels of the engine, four wheels of the tender, and four front coaches of the passenger train were thrown off the line, the rest of the train kept the rails, and all the coaches remained upright except two of those in front that were thrown off. The

engine was very little damaged, but the tender was very much damaged. The tank was stove in by the carriage behind it; and a boy, who was a passenger in the carriage next the tender, was taken out dead from the tank of the tender. The three leading carriages were destroyed, the fourth was much damaged, the fifth was slightly damaged, and the others were almost uninjured.

As the train approached Sittingbourne station the home and distant signals were at "all right" for it to run through. It ran past the distant-signal and up to within about 400 yards of the home-signal, at a reported speed of from 35 to 40 miles an hour. The home-signal was about this time thrown to "danger;" the signalman exhibited a red flag, and the engine-driver, fireman, and guards who were in charge of the passenger train did their best to stop it, but they could not do so before the engine, the speed of which is reported to have been but little checked, ran into two goods waggons (one of them loaded and the other empty) which had been pushed from the down line across the up road. These two waggons were broken to pieces, one was sent flying to the left and the other to the right side of the road. An axle and a pair of wheels of one of the waggons got under the engine of the passenger train. The axle of the goods waggon was doubled up, and caused the engine to leave the metals, and brought it to a stand about 70 yards beyond the crossing where it struck the goods waggons.

Sittingbourne station was opened for passenger traffic in the year 1857. There are sidings on both sides of the line. The station is protected by the ordinary home and distant signals which are good signals and can be well seen. The home-signal is at the east end of the up line platform, and the distant-signal is 800 yards east of the home-signal. The levers that work these signals and the several starting signals are placed close to the signalman's cabin, which is at the east end of the up line platform close to the home-signal. None of the points in the yard are connected with, or are worked from the signal-cabin, and they are not interlocked with the signals. At the east end of the station there are three sets of points on the down line. One set is 275 yards from the signal-cabin. These are the points furthest east. They lead from the down road across the up road into the sidings at the up side of the railway. It was at the place where this through crossing intersects the up line, that the collision happened. The second pair of points, which lead from the down line to the down sidings, are about 220 yards from the signal cabin. The third pair of points which are nearer to the station, had nothing to do with the catastrophe. The railway from the up distant-signal to within about 274 yards of Sittingbourne station bends to the right on a curve of 120 chains radius.

On the day in question the 6.50 a.m. goods train from Stewart's Lane to Faversham arrived at Sittingbourne station about 12.18 p.m., and the engine was employed after its arrival there, in doing a good deal of the yard shunting at both sides of the railway. It had been drawn clear of the up line about eight or nine minutes before the second portion of the "cheap fast up" train was due, and the goods engine-driver had notified to the signalman that the work had been done, and that the up line was clear, by blowing the engine whistle three times. The shunting was then continued at the down side. The engine, with 12 waggons attached to it, was, with the permission of the signalman, yard foreman, and head guard, brought out from the down sidings on to the down line, and was stopped when the last waggon got past the points furthest east on the down line. The head guard was riding on the fifth waggon from the engine, and the under guard on the last or twelfth waggon. When the engine and 12 goods waggons attached to it were brought to a stand on the down line the head guard got between the waggons and uncoupled the seven last from the leading portion of the train. He then gave the engine-driver the signal to push back, and he stated that he intended to run to the points leading to the down sidings and turn them, so that the seven loose waggons might run into the down sidings where the yard foreman had gone in order to turn them to where he wanted to place them. After giving the driver the signal to push back he turned towards the tail end of his train, and then observed the under guard sitting on and holding the points which turned the train across the up road to the up siding. At the same moment the head guard of the goods train saw the up passenger train approaching at full speed. It can only have been about 200 yards from him at the time. He ran across to the up line and waved his arms to stop the passenger train. Steam had already been shut off, the engine was reversed, and the guards' breaks were applied, but the train could not be stopped. The head guard stated that he did not know that the under guard was with the goods trucks at the time that he gave the engine-driver the signal to push back, but he knew that the foreman porter



had gone to hold the points of the siding inside the yard into which the seven waggons were intended to be run. The points where the foreman porter was standing are in the goods yard, about 63 yards west of the points which lead from the down line into the down goods sidings, and these last points through which the seven waggons were intended to be turned are about 55 yards west of the points which lead from the down line across the up line and into the up line sidings; so that the points which the under guard was holding were about 55 yards nearer to the head guard than the points which the head guard stated he intended to run to and turn, after he gave the engine-driver the signal to push back and shunt the waggons.

The evidence taken by me on the first day of the inquiry is as follows :

Edward John Elliott said:—I was the driver of the passenger train from Ramsgate on Saturday—the day of the accident—which was timed to leave at 11.30 a.m., but did not leave till 11.32. The train consisted of an engine and tender and 16 coaches, including two break-vans. We stopped at Broadstairs and East Margate, as the signals were against us at the latter place. We next stopped at Margate, and were checked at Birchington by the signals which were pulled off before we got up to them. We were next stopped by signals at Reculvers, then ran on to Herne Bay. Left Herne Bay at 12.27, the proper time being 12.13. Ran through Faversham, checking speed slightly, and were not timed to stop till we got to Chatham. As we approached Sittingbourne I noticed that the distant and home signals were at “all right,” and ran past the distant-signal at a speed of from 30 to 35 miles an hour, there being a rising gradient of 1 in 176. The first thing I saw was the guard standing in the road holding up both his hands. I think he was at the distant-signal side of the bridge under the railway. I at once shut off steam and opened the brake whistle, and while doing so, noticed that the home-signal was then at “danger,” although it had been lowered before. I then reversed my engine. I then saw some waggons passing across from the “down” line towards the line on which we were travelling. I had passed the bridge under the railway at this time. I then shut off steam, and held on as hard as I could with the reversing gear. I believe my engine struck the second or the leading truck of the waggons that were running back across the line on which we were travelling. I did not see exactly, as I sheltered myself under the cab of my engine. I was travelling with the engine in front and the tender behind. The fireman saw the “home”-signal go to “danger” just as I whistled, and saw the guard hold up his arms, and he applied the tender break at once, and remained at his post till after we came to a stand. My engine was a six-wheeled coupled engine. When she came to a stand, the leading and the driving wheels were off the rails on the right side, the trailing-wheels were on the rails. The leading wheels of the tender remained on the rails, and the middle and trailing wheels were thrown off the rails the same side as the engine. When the engine came to a stand, I observed one of the carriages of the train, which had mounted, fall over towards the tender. This was not the carriage that was next the tender, and I do not know which it was. The engine was very slightly damaged; the tender a good deal damaged, and the tank was stove in, and several of the leading carriages of the train were much damaged. I have been between 9 and 10 years in the Company’s service, and a driver four or five years. Neither I nor my fireman were hurt. The weather was fine at the time the accident happened. I do not think the engine left the rails when she struck the waggons. She seemed to drop off and come to a stand almost immediately afterwards. A pair of the wheels of the waggons got under the engine, and remained under her when she came to a stand. The axle of the goods waggon wheels was so bent that the wheels came nearly together. The gearing of the engine underneath was damaged by the waggon wheels.

William Dryland, fireman of the 11.30 a.m. cheap fast train from Ramsgate on the 31st August, said:—

As we approached Sittingbourne, I noticed the “distant”-signal which was at “all right” for us to pass, and after we had passed the “distant”-signal about 20 or 30 yards, I noticed the “home”-signal which was at “danger.” I at once called the driver’s attention to it, and I applied the tender brake the moment I spoke to the driver. He had already shut off his steam and was reversing his engine. He blew his brake whistle as soon as he reversed his engine. It was not many seconds before we saw the waggons. I opened my sand valve and held hard on my brake, and remained on the engine until she came to a stand, and was not hurt. I have been two years in the Company’s service, and about one year and nine months a fireman.

Thomas Forest Chapman, head guard of the cheap fast train from Ramsgate on the 31st August, said:—We were timed to leave Ramsgate at 11.30 a.m., and left at 11.32. The train was composed of an engine and tender, one third, two firsts, one second, a luggage van, and a luggage brake van in which I rode. Behind these were seven coaches, which formed the Ludgate Hill part of the train. There was a guard with the City portion. As we approached Sittingbourne I was looking out, but I did not see the “distant”-signal owing to the steam of the engine; but I saw the “home”-signal, which was at “all right.” I think we were just passing the “distant”-signal about this time. Soon after I heard a goods engine in the yard whistle, and then I heard our engine-driver whistle, and I set to screw up my brake as hard as I could, and immediately afterwards I felt a collision. I was slewed round, but did not loose hold of my brake, and my van came to a stand almost immediately. I am not hurt, but the muscle of my arm is a little sore. I got out of my van on the right-hand side and went up to see the driver. I saw him and the fireman at work all right and tried to get back, but could not get round the front of the engine owing to some trucks in the siding. I therefore went back and got through my van on the other side, and proceeded to assist the passengers. I saw three people taken out dead from under the débris, and there were a good number injured. I remained and gave all the assistance I could. I have been 13 or 14 years in the Company’s service, and 10 years a guard. I saw the “home”-signal was thrown to “danger,” but I cannot say exactly when.

John Mogford, second guard of the Holborn portion of the 11.30 cheap fast train from Ramsgate on the 31st August, said:—The Holborn portion consisted of a 3rd class, a 1st class, two 3rds, a 1st, and a composite, and a van in which I rode at the tail of the train. As we approached the Sittingbourne “distant”-signal it was at “all right,” and as I got past the “distant”-signal I observed the “home”-signal, which was also at “all right.” Immediately afterwards I heard the break whistle and applied my break. I then looked out and saw the “home”-signal at “danger,” and immediately afterwards I was knocked down by the shock of the collision. I was a little bruised in the hips. As soon as I got out I ran back towards the “distant”-signal, but I found this had been put to “danger,” so I returned to the train and rendered what assistance I could to the passengers. I have been nearly 12 years in the Company’s service, and nine years a guard.

Edward Gambell, signalman, Sittingbourne, said :— I was signalman on duty at Sittingbourne station on the 31st August, when the cheap fast Ramsgate train approached. According to the entry in my book, the first portion of the cheap fast train from Ramsgate was signalled on from Teynham at 12.29, and it reached and passed my box at 12.39. The second portion of this train from Ramsgate was signalled on from Teynham at 12.50, and I pulled the "home" and "distant" signals and "starting" signals off. At 12.56, this train came in collision with some goods waggons which were being shunted over from the down across the up main line at the eastern end of the yard. On the arrival of the 6.50 a.m. goods from Stewart's Lane I gave the driver directions to pull down and shunt into the Sheerness side of the station, which is on the down side of the line, then pull down over Sheerness points and back into the Sheerness siding. The guard asked me if they could get to work. I inquired what he had to do. He told me he had some trucks to attach and detach, and before giving him permission to occupy the down main line, I ascertained from New Brompton that the 10.48 a.m. cheap fast down train had not left Chatham. I then gave him permission to occupy the down main line, which they did, and went to the eastern end of the yard, and as they approached there the driver whistled twice to ask permission to cross from the down main line into the up siding. They crossed the line to the up siding—12 or 14 trucks. This was after the passing of the first portion of the cheap fast at 12.39. The driver whistled for permission to cross to the up siding after some shunting had been done, and I gave him permission to cross. The goods train occupied the up line from that time till 12.50. After they had done shunting they returned to the down line, and the driver gave three whistles, which signified that he had got clear of the up line. The engine subsequently went into the Sheerness siding on to the rest of the train. The guard came and asked me again whether they could go out again on to the down main line. I inquired by telegraph about the down train, and finding that she had not reached Chatham I gave him permission to go out again on to the down line. The engine brought a number of trucks out of the siding on to the down line. I had taken my signals off for the up train at this time, and as I saw the goods train drawing down to the eastern end of the yard, I watched closely what they were doing, and I observed a man go to the points lever of the road that leads from the down line across the up line into the sidings on that side. The goods train was moving back when I saw the man at the lever, and I waived my flag violently to try and attract the attention of the people with the goods train, and I also turned round and threw my up line signals to "danger." I saw the passenger train approach at this time; it was, I think, about at the "distant" signal. The goods train was moving back at the time. I think the waggons had come to a stand about the crossing of the up line when the engine of the passenger train ran against them. Both the up and the down lines were blocked at this time both on the telegraph instrument and by signals. I have been 16 years signalman with the Company, and a great part of my time has been spent at Sittingbourne station.

Albert Love, driver of the 6.50 down goods from Stewart's Lane on the 31st August, said :—We left at the right time, and reached Sittingbourne at 12.18, but was not due there till 12.40. I was engaged shunting first on the down side. I think I had about 15 waggons and 2 brake-vans when I arrived at Sittingbourne. I first of all put my train into Sheerness siding, at the far end of the station, on the down side. The guard told me I might go out on to the down line to do my shunting, but before doing so I asked him whether the signalman had given leave, and he told me that he had. I had some waggons to take from the down sidings into the sidings at the up side. Before doing so I blew twice, which is the way

I ask permission to cross the road. He came out of his box, and gave me an "all right" signal with his hand. I then put my train across to the up side. I brought some trucks out of the up side, and went across on to the down main line so as to clear the line for the up train, and when I reached the down line I blew up three whistles to tell the signalman that I had cleared the up line. The head guard of my train wanted some of the trucks put into the down sidings, and he gave me a signal to knock them back into the down sidings. I proceeded to do this, but instead of the waggons going into the down sidings as they ought, they went across the road on to the up line. As soon as I saw them going across the up line I called the head guard's attention to it, by halloing to him that the up train was on. I moved my engine back a little way, hoping that I might be able to hook the loose waggons on, but finding that I could not do so, I moved my engine ahead again out of the way. I think there were about 12 waggons altogether behind my engine, but I don't know how many were unhooked or how many were fixed to it. At this time I just saw the passenger train coming under the bridge, just about at the "distant" signal. I opened my whistle to warn the driver of the passenger train, and I saw that he had applied his breaks. I think the passenger train struck the waggons at a speed of about 35 miles an hour. The engine of the passenger train appeared to me to strike between the two last waggons, which were the leading ones as I pushed them across the road. I think the waggons had come to a stand just on the crossing of the up line. I have been for eight years in the Company's service, and two years a driver. The two waggons that were struck by the passenger engine were knocked off the rails, one being thrown to the up side and the other to the down side, and were considerably damaged.

Jacob Moden, head guard of the 6.50 a.m. goods from Stewart's Lane on the 31st August, said :— We reached Sittingbourne at 12.18. On our arrival the station foreman told me to do some shunting, which he wanted my engine to do. I told the driver to pull down and put my train into the Sheerness siding, on the down side of the line. I then uncoupled the engine, and it went into one of the "down" sidings, and brought 12 or 15 waggons on to the "down" road. I told the driver to whistle up for leave to cross, which was given by showing a white flag, and my engine went across three times (after the first part of the cheap up had passed) to do the shunting that was required on to the "down" line, so as to clear the "up" line for the second portion of the cheap fast. We had finished all the shunting that was required on the "up" side at this time, and the driver whistled up three times to tell the signalman that he was clear of the "up" road. After this I went again into the Sheerness sidings, and, I think, inquired of the signalman whether I could go on with my shunting, as I knew that the 10.48 fast was either due or overdue. The signalman told me I had plenty of time to do the shunting, so I hooked on eight waggons of the train that I had brought to Sittingbourne to the engine which had four waggons then attached to it, and brought the engine and 12 waggons out on to the "down" road. I rode on the fifth waggon as it was drawn out of the Sheerness sidings on to the "down" road. I stopped the engine-driver when I thought he had drawn far enough down so as to have his train clear of the points that led from the "down" line into the sidings of the "down" side. I then called the driver back, and I think at this time I was at the "down" side of the "down" line, and after calling him back, I ran back towards the points to hold them. But as I was running back I saw Clark, my under-guard, pull over the points of the crossing that leads across the "up" line into the sidings of the "up" side. I was about five waggons length from him, and I called to him as loudly as I could. The points of the crossings to the sidings at the "up" side of the line were nearer to me than

the points leading to the sidings of the "down" side. Clark did not seem to heed me or to understand me. I do not think the waggons had reached him when I first called to him, but they did a moment afterwards, and passed by the crossing over towards the "up" line. I do not know whether I got under or over the waggons, or how I got across to the "up" road, but I ran towards the passenger train holding out both my arms to stop it. I remained on the "up" road until the passenger train got close to me, and then got down the bank on the "up" side, where I sat, when the passenger train passed at a speed of about 35 or 40 miles an hour. The engine of the passenger train struck the leading waggon as they went across towards the "up" line. It knocked it to pieces, and threw it across to the down side of the line on its side. I have been about 20 years in railway employment, and have been three years a guard with this Company. It was the first day that the under-guard was with me. I cannot say exactly whether he had held points before, but I believe he must have done so in the various shunting operations that have been performed. On arriving at Sittingbourne, I had an engine, a tender, 14 waggons, and two break-vans at the tail of the train. The under-guard was in the hind one, and I in the next to it. I cannot recollect whether the under-guard had held the points or not, but I think there is no doubt he

had held some of them during shunting operations. I rode on the fifth waggon because I wanted to uncouple the tail lot of seven that were to be put back into the "down" sidings. I do not recollect seeing my under-guard after I came across from the "up" side of the line and went into the "down" sidings, where he detached eight waggons from the tail of my train. The engine then drew out 12 waggons on to the "down" line, and I rode on the fifth waggon in order to uncouple seven which were to be put back into the sidings of the "down" side.

Charles Clark, under guard of the 6.50 a.m. down train from Stewart's Lane on the 31st August, was next called. Clark having been warned that as he is implicated by the previous evidence, and having held the points which turned the goods train on to the road that the passenger train was travelling on, is informed that he need not give any evidence unless he desires to do so, and a question being put to him, he states:—That he has been 13 weeks in railway company's service, and five weeks doing duty as second guard, and the rest of the time as shunter at the sorting sidings at Herne Hill. I held the points for the goods train to pass, thinking the head guard called to me to do so. I would prefer not deciding on giving any further evidence till to-morrow.

The inquiry was here adjourned.

Second Day.—Inquiry resumed.

This evidence was given to the Coroner. I attended the court in compliance with the Coroner's application and orders of Board of Trade.

Charles Clark, under guard of the 6.50 a.m. down goods train from Stewart's Lane on the 31st August, said:—When the goods train arrived at Sittingbourne it stopped on the "down" road, and the signalman gave instructions that it was to be put into Sheerness siding, which is on the down side of the line. I rode in the last van of the train, and the head guard was in the van in front of me. The engine was uncoupled and went across to the up side to do some shunting. I held the points at the up side of the line for the engine to push some trucks through on to the siding next the up road. The foreman shunter told me to hold the points. I do not recollect who held the points of the cross-over road from the down line at this time. The foreman-porter went down the siding with the head-guard to hook on some waggons. The engine then came out with some waggons and went across on to the "down" line and knocked four trucks on to the "down" line, and I held the safety-points for the engine to pass out from the up sidings on to the down road. The engine then went to pick up some more trucks in the down sidings, and I do not recollect doing anything at this time. The engine then came and picked up the four waggons that were on the down road, and I coupled up the four waggons to the rest of the train, and they, with some others, were put into one of the sidings at the down side. I cannot recollect which. The engine then went with some trucks attached to her into the Sheerness sidings, and I coupled the part of the goods train that had been left there on to the rest of the train, and uncoupled 12 as the head-guard told me to do. The train then pulled out on the down main line and I followed her, riding on the last waggon of the train. The head guard was riding on one of the waggons nearer to the engine. I believe the foreman porter was in the yard at this time, but I did not see where he was. The head guard signalled for the train to pull up when it got on the down line. I think it went about 12 yards beyond the cross-over to the up side. I saw the head guard get down and go under between the trucks to uncouple some. I believe he uncoupled seven, and as he was getting

out I thought I heard him call to me to hold the points. He did not say which. I knew the trucks were intended for the back road at the down side, but I made a mistake and caught hold of the lever of the points that lead across from the down line to the sidings of the up side. I think I knelt on the lever. I heard the head guard calling to me, but this was not till the waggons had gone across the road on to the up line. I did not see the passenger train till the trucks, which were shunted very slowly, had come to stand. At this time I saw the passenger train about 200 yards off. I have been 13 weeks in railway service and 5 weeks a second guard. During these 5 weeks I had frequently held the points at the several stations where shunting had to be done. It was always by order that I held the points, from either my head guard or the foreman shunter. During the 8 weeks previous to my being appointed second guard I had been employed as a shunter in the Herne Hill sorting sidings. When I held the points on the 31st August, which led to the accident, I believed and do believe that I was ordered to do so by the head guard, but I made a mistake in taking hold of the lever of the wrong points. I had had 8 weeks in the sorting sidings at Herne Hill, and I suppose was considered quite competent to do any shunting I might be called upon to do at any time. I had worked this train (6.50 down from Stewart's Lane) before—four times before the accident; three times that same week, and once in a previous week, and had worked back with the same each time. The train on the down journey always stopped at Sittingbourne, and the same train on return stopped there. Shunting was done during the stoppages, generally about half an hour's work. I had held points there, but not many. I had worked with the 6.45 p.m. train from London to Faversham and back. This train stops at Sittingbourne and does shunting there, and I have assisted in its performance. No one complained of the way in which I did my shunting. Have worked the 6.15 p.m. from Stewart's Lane to Blackfriars and Herne Hill sorting sidings, and the train that comes from Herne Hill sorting sidings to Camberwell in the morning and back,

and from Stewart's Lane in the evening. Have worked with this train about 3½ weeks. Ran a pilot one Saturday night from Herne Hill sorting sidings to Beckenham and back. Was working as second guard on each of these occasions. I was looking at the guard when he came out from under the trucks and thought he called to me. The guard was running towards me and called me back. Had not got hold of the points when the guard came out from under the train. I was looking away from the line over the fields, with my back to the trucks; was not looking at anything in the fields particularly.

William Burden, foreman of the goods department at Sittingbourne, gave evidence as follows:—I was in charge of the shunting at the time of the collision on Saturday morning, August 31. The 6.50 goods train from London arrived at Sittingbourne at 12.15 noon. I put the train in the Sheerness siding under the arcade. I then gave the driver a written order to do some station shunting.

Alfred Love, the engine-driver, recalled, said that in speaking on Monday of the order as a verbal one, he had forgotten the facts. It was a written order.

Burden's examination was then continued. He said:—I have not a copy of the order. Its effect was to put over seven waggons from the down siding to the up siding, and bring four waggons from the up siding and put them in the down siding. We completed our shunting according to the order. The signalman, Gambell, put out a red flag as a signal that he wanted the up line. As soon as the engine of the goods train was clear of the up line she blew three whistles as a signal that we had finished with it. Then we went back on the goods train in the Sheerness siding, bringing out in all 12 waggons. I told Moden, the guard, to put off seven waggons in the back road of the down siding, and that I would hold the back road points, if he would turn the waggons into the siding. He answered me "all-right." I was then standing at the signal-box with the guard Moden. I went to the back road points of the down siding accordingly. I held the points, waiting for the waggons to come back. On my hearing the engine "beat" (i.e., show that it was starting forward or backward), and not seeing the guard at the points, I let go the back road points and went forward to see where the guard was. Then I saw the under guard, Clark, sitting on the cross-over road points leading to the siding. He was sitting on the handle of the points leading to the goods shed of the up siding—that is, the points which lead across the line. I saw at the same moment the up train running round the curve. It was the cheap fast express. I called as loud as I was able. I shouted with all my might, and ran in the direction of the under guard, Clark, telling him to let go the points. I asked him if he did not see the up train running into him. I also saw the head guard, Moden, running towards Clark, and heard him telling Clark to let go the points. I saw that where the guard, Moden, had unhooked his waggons, he was getting between the couplings, trying to hook them on again where he had uncoupled them. He could not do it. In about a second the train ran into the first two waggons that were across the line.

The Coroner.—What happened?—It knocked several carriages off the road, killed several people, and injured others.

How far were you from Clark when you first called to him?—About 200 yards, Sir.

Was it his duty to take that point?—No, Sir.

It was not?—No, Sir.

Where did you first see the express?—I could not say the exact distance. I could see no bridge where I was. The express was about 300 yards off.

By Mr. M'Intyre.—We had completely finished all the shunting that was to be done on the up line seven or eight minutes before the accident occurred. None

of the shunting upon which we were engaged on the down line would in any way interfere with the up line. It would leave the up line perfectly safe and clear for the passage of trains along it. I have been engaged nearly three years on railways, and I have been shunting within about two months from the time I started. In shunting these waggons back to where I intended them to go, the back road in the goods yard, there were two sets of points to be worked at the same time. The one set I intended to work myself. I had it in my hand.

Whose duty was it to work the other set?—The head guard, Moden, had arranged with me to do it.

Had that been done could any accident have occurred?—No, Sir. The points I held were those leading into the back road. They were about 90 yards from the other points that ought to have been turned. The waggons that were to come into the back road line would travel along the main line till they reached the points which Moden ought to have turned. When I first heard the engine beat, the goods train was between 300 and 400 yards from me. Between the place at which the goods train was then and the points which Moden ought to have turned, there were other points—the cross-over points. Those are a considerable distance from the points which would have turned the waggons into the siding. If the cross-over points had not been interfered with, the goods train would have run along the main down line until it would have come to Moden's points, when it would have been turned off from the main down line into the siding. That was what was intended by myself and Moden. Clark had no right to interfere with any of the points without instructions from me or from Moden.

Did you give Clark any instructions whatever as to meddling with the points?—No, Sir, I did not even know he was down that way at all. The cheap fast train was nearer to the station than the distance-signal when I first saw it.

By Mr. Hendriks.—I have been in the employ of the Company two years and nine months. I began as a porter at Faversham. I have been 12 months foreman of this yard. I act under printed instructions. I have not got them with me.

The "General Instructions," dated 1867, were then put in by Mr. M'Intyre.

The witness said the copy was similar to that under which he acted.

At Mr. Hendrik's request, he turned to the page in the book which directs shunting operations (p. 69).

Mr. Hendriks.—At page 69 in the book, paragraph 234, is this:—"The forming of trains, shifting of waggons, &c., must be conducted by the foreman or head porter only, and under proper precautions." "Only" is printed in thicker letters. Is that so?—Yes, Sir.

Did you know Clark before this day?—I had seen him before.

Had he ever done any work before?—Yes, Sir, I am positive he had worked in the yard before. I am not sure whether it was on Thursday or Friday.

Are you sure he had handled any points at all in that yard before?—Yes, Sir, positive.

Under whose direction?—Under mine.

In answer to further questions the witness said,—Moden asked me, when we were standing together at the end of the platform, where I would have the trucks. I said to him, "In the back road on the down side." Clark had attended to some other points that morning under my directions in doing the station shunting. These cross-over road points had been used that morning by me. Clark had not handled them. I cannot say what actuated Clark to open these wrong points. There is no padlock on the lever of these points. Any evil-disposed person could go and put the points over. They would fall back. I cannot say whether he would put a stone under to hold them. He could put, if not a stone, anything which would be strong enough to hold them. There

is no precaution taken to prevent improper persons from moving the points. They are not fastened.

Colonel Rich.—Are those cross-over points within sight of the signalman?—Yes.

Has he to look after them?—I cannot say.

Who has charge of them?—(The witness made no answer.)

Who oils them?—A passenger porter.

Have you any charge of them?—No, Sir.

Do you see they are right when doing the shunting work?—Yes, Sir.

Can those points be manipulated by every one? Can every one walk about the yard?—No one is allowed to walk about the yard.

Would you allow the points to be handled?—No, Sir.

Would you prevent any one from handling them?—Yes, Sir.

When you are doing shunting operations with such a train as the goods train, is it you who give the orders what trucks to take on and put off?—What trucks to take on. He knows what to take off.

Do you direct him where to place trucks that are to be taken off, and also what trucks are to be taken off?—Yes, Sir.

The moving of these often involves the moving of other things in the yard. Do you tell him where to move them?—Yes.

Who, after the instructions are given, does the shunting?—There are myself and a man in the station to do the shunting. The driver moves the engine as directed by the guard. I give the guard the orders, and the man employed in the yard holds the points. In this case this man was at dinner. He was not on the spot. The guards that are with the train do as follows:—The head guard unhooks and hooks on the waggons, and the under-guard sees that they do not run back too far.

Do the guards never hold the points?—Very seldom. Sometimes, when it is necessary.

Then how came you to let these guards do it this morning, for it seems that both had done it before the accident took place?—Because I was by myself. I let them do it that day because there was nobody else. In such cases the guard does it, and sometimes the under-guard.

How came you to let the two of them do it?—The under-guard, perhaps, acted under the instructions of the head-guard.

Are you sure that you are right, because I do not see any regulation in your book, and I do not know any railway in the kingdom in which guards do not assist in holding the points?—They always do assist me if there is no one there. But, as a rule, my man and I do all the shunting.

When the two are there?—We do not want any one to assist. The guards do not hold the points then. I did not hear the guard Moden give orders to Clark to hold the points.

How did Clarke come to hold them before?—Because I told him to hold them.

You had told Clarke to hold points that day?—Yes, Sir.

Which points did you tell Clarke to hold that day?—The turn-out points on the main line.

By Mr. Hendriks and Colonel Rich.—There is no connexion at all between these cross-over points and the signal-box, or the signal.

By the Jury.—The cross-over-points are entirely unprotected. The footpath is between the cross-over points and the points leading to the down-siding. I have often seen boys playing on the footpath and have warned them off.

Jacob Moden, the head guard, was then recalled.

Colonel Rich.—You gave evidence that you gave the signal to the driver to push these waggons back that had been uncoupled. How did you give the signal?—By my arm.

Why did you call him back before the points were properly set?—I meant to hold them myself.

If you were going back, why did you not do so, and push the fellow off the points?—After I saw I could not do any good, I rushed into the up-road.

Is it not a rule that before you call a driver back to shunt you must see that the points are properly set? Must not the signalman do so, and were you not the signalman for the driver? Why did you call him back before the points were properly set?—I called him back, intending to set the points myself.

You would have reached the cross-over points before the points you had to set?—Yes.

You gave the order when the waggons were a long way in front of you, and before you began to run?—Yes.

Were you standing where you uncoupled?—Yes, I believe so.

And you gave him a signal to push back?—Yes.

And he started these seven waggons ahead of you, and you gave him a signal to push these waggons, seven of them being ahead of you?—I believe I was some two or three from where I uncoupled.

Still, you were not in a place where you could set the points; for otherwise you must have passed this place where the under guard was sitting?—I could not reach there in time to push him off.

If you had not given the signal to the driver to push back, this could not have happened. Could it?

The Coroner.—What do you say to that?—Well, it is hard for a man that; because he signals to the driver when he knows there is plenty of time to get there. I should have got there, if he had not taken the waggons across.

Colonel Rich.—It is 120 yards from the place where you gave the order to those points. Can you run the last 70 yards quicker than the first 50?—Well, from where I was I could have got to the points in a minute or two.

Do not you know that you should not have given that driver the signal to push back till the points were ready for him?—Well, I could not be with the train and be there too. I went down with the train.

Why could you not have uncoupled the waggons, gone to the points, and then given the signal? That was your proper way of doing the work.

The Coroner.—What is your answer to that?—I cannot answer in that way; only in the ordinary way of railway work, when shunting operations are going on, there is often a signal given by the guard and other people before they actually get to the points. That is all I can say, when I know that I could have got to that point if he had not turned the train over.

Colonel Rich.—But the foreman porter told you to hold these points?—No, he told me where to put the waggons, and I knew there were two pairs of points leading to the sidings where he wanted the waggons, and I was going to hold one set while he held the others.

Could not the under guard have held the others?—He could have if he had been ordered.

Was it not more proper for you or the foreman porter to hold the main line points?—That is what I expected to do.

Then why did you give the signal to push back before you held the points?—Because there was plenty of time for me to get back.

Mr. Hendriks.—You would have ridden on the trucks?—No, Sir, I should have run.

Colonel Rich.—You would not only have had to run as fast as the trucks went, and they sometimes go very fast when they fly shunt, but you were to outrun seven trucks. The points where you saw the waggons turning were only 50 yards from the other points, and you could not have run all the way along those seven waggons and the other 50 yards in time. How could you have got to that other point in the time by which the waggons would have run it.

By Mr. McIntyre (through the Coroner).—The driver was shunting gently. There was nothing rash, nothing wrong.

By Colonel Rich.—I did not call to the under guard to hold the points.

Burden, foreman porter, recalled, and examined by Colonel Rich.—I directed the seven trucks to be shunted. I knew they had to be uncoupled. I left that to the head guard. I expected the head guard to hold the points. It was the under guard's duty to scotch up the waggons. He had held other points.

Would he not have done very well to hold the points in the back yard while you held those on the main line? Why did you not hold those on the main line?—Because it was arranged between him and me that he should do that, he being nearer them. The engine would go slow. I expected him to set the points before calling the engine back.

By Mr. McIntyre.—In shunting back, the driver would be shunting against the gradient.

Charles Clark was now recalled.

By Mr. McIntyre.—I received a very good character from Messrs. Hall at Faversham to the Company. There is much shunting at Herne Hill, and I received

instructions during the eight weeks I was there. I was afterwards working to Stewart's Lane, where there is much shunting, but not for guards. I was mostly on night work, I came down to Faversham with the 6.45 p.m. twice, which is something similar to this train. We had shunting to be done at various stations on the line. I was at Sittingbourne four days before the accident, and had some shunting there. I shunted 13 times there, seven coming up and six going down. I am slightly hard of hearing.

To the Coroner.—I have no difficulty in hearing you.

By Mr. Hendriks.—Our hearing is not tested in any way at the yard. I do not know who promoted me to be guard after eight weeks' shunting. I believe they were short handed of guards. I got a rise in pay of 1s., and that made my wages 22s. a week. I still think I heard the head guard say, "Pull the points over." I have not had any conversation with the guard since the accident. Having heard that he denies giving the instructions, I still think he gave them.

The evidence as to the position of the passenger train, when the engine driver, fireman, and guards in charge of this train, the signalman at Sittingbourne station and the servants who were attending to the goods train, became aware of the danger, does not quite agree as satisfactorily as could be desired.

I have since taken the evidence of the fireman of the goods train, which I attach, together with the following extracts relating to this collision, taken from the evidence given to the Coroner, when I was not in court, which bear on the subject.

James Frost, fireman of the goods train at Sittingbourne on the 31st August :—I first saw the passenger train when it was about 150 yards from the trucks, my engine had pushed across the main line. This was before my driver whistled. At this time I noticed the stop-signal at the station at "all-right," and as I was turning round I saw it thrown up in the face of the driver of the passenger train. I think the passenger train was running at 40 to 45 miles an hour at the time. I was on the left or the rear side of the engine, and I saw Clark, the under-guard, who was at the same side of the train, give me a signal to push back, and my mate Alfred Love said he got a signal to push back from Moden, who was at the 6-ft. side. After I gave the signal to my driver to push back and the trucks had got into motion, I noticed that Clark had pulled the wrong points, so I told my mate, and he stopped the engine, and I put the break on. If it had not been for my noticing the points wrong when I did the trucks would have been pushed hard enough to run into the siding under the arcade at the down side. I have been passed fireman for four months, and going on for four years in the Company's service. I did not see Moden from the time we came on the down line when the trucks were uncoupled until after the accident.

The engine-driver of the goods train stated :—I had a signal from my mate, Samuel Frost, to knock the trucks up. I slightly touched them, when, seeing the error of the under-guard,—the trucks going

across the main line,—I called to the head guard Moden and told him the up train was on, and went back a little way with my train to try and let him catch the trucks on again which had been uncoupled. Finding he did not do so, that he could not do so as he had not time, I ran ahead with the trucks I had on the engine, and, looking up, saw the train coming through the bridge 200 yards off or more. I ran ahead and blew my big whistle to warn the driver of the express train.

Jacob Moden, the head guard, stated :—I then saw Clark pull or hold over the cross-over points leading from the down main line across the up line to the sidings on the up side that crossed the up main line. I called out to him, but was unable to get his attention. I then ran out on the up road and held up both my arms to the cheap fast train, which I saw approaching at about 40 miles an hour. I saw it first about 100 or 200 yards off this side of the distant-signal.

Signalman *Gambell* stated :—I saw a man, I could not distinguish whom, go and take hold of the lever of the cross-over points. I immediately took my red flag and waved it violently across the up main line, and threw up my signals, to endeavour to stop the second part of the cheap fast train. At this time two or more trucks were standing on the cross-over road. I saw the express coming apparently under Murston bridge.

[He again stated, in answer to a question, "I threw up my signals when I saw the steam at Murston bridge."]

Now Murston bridge is 534 yards further from Sittingbourne station than the up distant-signal, and if this signal had been put to "danger" at this time, as the signalman stated it was, the engine-driver of the passenger train could have seen it and could have stopped his train. Every other evidence affirms, and I have no doubt truly, that the up distant-signal was at "all right" when the passenger train passed it.

On the day previous to Gambell giving his evidence to the Coroner, he had told me that he thought the passenger train was about at the distant-signal when he threw up his signals.

Burden, the foreman of the goods department, who was engaged with the goods train, and was in such a position that he could observe what was passing, says: that he heard the beat of the goods engine when it commenced to push back the trucks, and, as he saw no one at the points leading to the down siding, he went forward, and then saw Clark, the under guard, sitting on the lever of the points which led across the up line. He says he was 200 yards from Clark at this time and 300 yards from the express. This would place the express only about 120 yards from the point of collision at the time that the goods trucks were being shunted back. The statements of men as to distance, position, and speed at times of such intense excitement, cannot always be relied on. I examined many of the men on the ground of the accident, and made them point out the places before taking their evidence. There can be no doubt that the passenger train was inside the distant-signal before any alarm of danger by signal or otherwise was given. I believe that the first alarm was when the engine-driver of the "cheap fast" saw the guard on the up line in front of him, holding up his arms. I think the passenger train was within 200 yards of the place where it struck the goods train at this time. The evidence of the guards and of the foreman of the yard lead me to the same conclusion. The engine-driver of the passenger train, immediately after seeing the guard, observed the home-signal to be at "danger," which had previously been at "all right;" and then he saw the goods waggons across the road. He could not have seen them before, owing to the before-mentioned curve in the railway. He was running into Sittingbourne station at a speed of 35 to 40 miles an hour, believing, from having seen the signals at "all right," that the road was clear; and he must have been surprised to see the guard waving his arms. I do not believe that he could, under these circumstances, have applied a continuous break before his train had run over more than half the distance towards the obstruction. Continuous breaks take some seconds to act. Late trials show that stoppages have been made under 200 yards with trains travelling at 40 miles an hour, but it is a very different matter stopping under circumstances like those at Sittingbourne, and stopping where everything is in the most perfect order for trial, so as to obtain the best results, and when all the parties with the train know that the breaks are to be applied, and are ready waiting for a signal to apply them. There is no doubt that all trains ought to be fitted with continuous breaks, and if the cheap fast up express had been so fitted I am of opinion that although the use of them would not have prevented the collision from taking place it would certainly have been the means of materially diminishing the severity of the shock of the collision.

This deplorable accident appears to have been caused by the neglect of the head guard and a mistake of the under guard of the 6.50 a.m. goods train from Stewart's Lane.

The head guard should not have given the engine driver the signal to shunt back the seven loose waggons until he had placed the points in the proper position for the goods waggons to run into the sidings at the down side of the line where they were intended to be placed; and the under guard, who had only been 13 weeks in railway service, should have been more careful in seeing that he laid hold of the proper lever. By his carelessness in moving the wrong lever he turned the goods waggons across the line on which the up passenger train was running. The under guard was perfectly conversant with the different roads and points, and knew where the goods waggons were intended to be shunted.

This man's mistake is one that has often been made by the most experienced and best conducted pointsmen. The collision could not possibly have happened if these points had been interlocked with the signals, and had been worked from a properly placed signal-cabin, in the charge of the signaller.

Sittingbourne station was opened for passenger traffic before the interlocking of signals and points was introduced. It was not adopted by railway companies, nor was it made a requirement of the Board of Trade until some time afterwards, but it has been insisted on by the Board of Trade for many years past in the case of all new lines and works submitted for inspection over which they have control.

I am informed that the London, Chatham, and Dover Railway Company had just taken Sittingbourne station in hand, and were making arrangements to fit it with the interlocking arrangements, which are now very generally adopted, and are a perfect security against accidents of the present kind.

The servants of the railway company who were in charge of the passenger train,

the signalman on duty at Sittingbourne station, and the engine-driver and fireman of the goods train, appear to have done their duty.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. H. RICH,
Colonel R.E.

NOTE.—There is a public footpath across the railway at the east end of Sittingbourne station, which I understand is much used by children. The danger of this footpath was brought to my notice during the investigation. It should if possible be shut up and a bridge be substituted for it.

Printed copies of the above report were sent to the Company on 21st November 1878.

LONDON, CHATHAM, AND DOVER RAILWAY.

Board of Trade, (Railway Department,)
13, Downing Street, London, S.W., 12th December 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 30th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 29th ultimo to the up boat express passenger train, near Bickley station, on the London, Chatham, and Dover Railway, from the fracture of the leading axle of the tender.

Two passengers in the train complained of having been shaken, and one of the guards was somewhat seriously hurt, so that he was unable to attend at my inquiry on the 5th inst.

The tender of the engine had one axle broken and another bent: three holes were made in the bottom of the tank. The break-work under it was broken. The leading break-van, which was thrown off the rails and over on to its left side, had one side, end, roof, and under-carriage very much damaged, axles bent, 10-inch cylinder broken, and cylinder and spring gear damaged and missing.

The composite carriage was off the road, and had the side, end, roof, and under-carriage much damaged, axles bent, break-work much damaged, leakage valve and drip-cock missing.

First-class carriage was off the road: end and side and under-carriage much damaged; axles bent. This carriage was only fitted with break-pipes.

Second-class carriage: under-carriage damaged, 8-inch cylinder broken, and break-gear much damaged.

First-class was off the road: under-carriage much damaged; fitted with double blocks; double cylinder broken; break-gear much damaged.

Rear break-van: draw-bar and break-shaft bent and step-irons broken. No damage was done to Westinghouse's break-gear.

The line about a mile on the eastern side of Bickley station is on an easy curve to the left of 72 chains radius, on a rising gradient of 1 in 132 for a short distance, and this is succeeded by a portion of level line. The South-Eastern Railway crosses the line by an over-bridge about 61 chains east of Bickley station.

Walter Stark, engine-driver, 16 years on the London, Chatham, and Dover Railway, and four years previously on the Great Eastern Railway, states:—I was driving engine (Europa) No. 53 on the morning of the 29th November, which brought the 4.15 a.m. up boat express from Dover. The train consisted of engine and tender, break-van, composite first-class, second-class, first-class, and a break-van at the tail of the train, six vehicles altogether, besides the engine and tender. It was fitted with Westinghouse's automatic continuous break, applied to all the vehicles in the train with the exception of the engine and the first 1st-class carriage, the third vehicle from the engine, and it had two guards, one riding in the front and the other in the rear break-van. We left Dover at four minutes past five a.m., stopped at Chatham, and left there about eight minutes past six a.m., somewhat late. We were running at about our usual rate as we

were approaching Bickley, that rate being about 45 miles an hour, and the first thing that I heard of anything being wrong was as if the tender had got off the rails; then I went to apply the break, and I felt that the break had got on before I could apply it. I opened the valve, but before I opened the valve I heard the air blowing from the pipes under the tender; and if there had not been anything wrong under the tender I ought not to have heard that noise when I opened the valve. I heard the noise as if the tender had got off the rails just at the spot where the fish-bolts at the two opposite joints were afterwards found to have been broken, as pointed out on inquiry. Up to that time there had not been any diminution in the speed of the train. I was standing with one foot on the foot-plate of the tender, and the other on the foot-plate of the engine, and I was not aware that there had been any unusual movement of the tender,

oscillating from side to side, before the spot where the fish-bolts were broken. I have driven this train frequently, about every fourth day, fitted with the Westinghouse break, for more than twelve months, and have often had occasion during that time to apply the Westinghouse break. I was running with about the same amount of pressure for working the Westinghouse break as usual, and on that morning it was 100 lbs. pressure. The Westinghouse break acted very quickly on this occasion, as quickly as I have found it on previous occasions. I thought that the leading end of the tender had dropped down, as the flap of the tender was sticking up: this flap was almost straight up. I think that both leading wheels of the tender were off the rails from the spot where the fish-bolts were broken up to the under-bridge, and after passing it, the right wheel of the tender got under the tender and threw it off the rails, so that the left wheels of the centre and trailing wheels of the tender were outside the left rail, and the right wheels inside the right rail; that continued up to the South-Eastern bridge, through it, and up to the spot where we stopped. The leading break-van got off the rails half-way between the under-bridge and the South-Eastern bridge: that got off on the left side also, and continued to run off the rails until it struck the brickwork of the South-Eastern Railway over-bridge, and then the coupling between it and the tender snapped. It was the tender coupling that snapped. I think the speed had been reduced to about 25 miles an hour when the break-van struck the brickwork of the bridge. I did not feel much of a blow. The tender was then running off the rails. The coupling between the engine and the tender held up the leading end of the tender. I did not reverse the engine, but shut off the steam and opened the break-valve, but the break was self-applied. The break-vans were also fitted with the ordinary hand-screw breaks. I did not sound the whistle. This happened about 20 minutes to 7 a.m. When we stopped I told my fireman to run up to the signal-box, and to tell the signalman to block both lines, and he went at once. It was a rather thick morning, but not wet. After we stopped I found that the break apparatus under the tender was all pulled down, so that when the engine and tender broke away from the train there was nothing to stop their progress. On examining the train when it stopped, I found that none of the vehicles in the train had the break-blocks pressed against the wheels, except those on the last break-van. The break-gearing under some of the vehicles was pulled down, so that the break-blocks could not be put on the wheels; but I think the break-blocks had been put on, on all the vehicles fitted with them, up to the time when we passed the under-bridge. I felt that it had been put on. I was forced forwards against the fire-box.

Robert Kebble, fireman between five and six years, states:—I was fireman to Walter Stark on the morning of the 29th November. All went right with the up boat train until we were approaching Bickley station, and we were then running at about 45 miles an hour, the usual rate. The engine and tender were running very steadily until we heard the noise of being off the road, when the flap of the tender was raised up, and the leading end of the tender dropped down. My mate and I noticed it about the same time. The patent break went on before my mate opened the break-valve. There was a good deal of diminution of the speed of the train before we struck the railway bridge, when we might be running about 25 miles an hour. The driver did not whistle nor reverse the engine. But the engine and tender stopped some distance from the rest of the train. The tender wheels were all off the rails to the left. I ran forward at once to the ballast pit signal-box and told the signalman to block both roads and to telegraph for the break-down gang.

William Gray, guard between 13 and 14 years, states:—I was under guard of the 4.15 a.m. up

boat train from Dover on the 29th November, and I rode in the last break-van. I do not keep a record of the time, but I believe the train left Dover at 5.3 a.m., ran all right to Chatham, where it stopped, and then went on. The first intimation which I had that something was wrong was that the patent break in my van was put on very sharply, and at that time we were running at our usual rate, perhaps between 40 and 45 miles an hour. This occurred somewhat about the under-bridge which is reached before the South-Eastern Railway bridge. I could not say exactly whether my van had or had not reached that under-bridge. I felt the patent break go on, and it continued on until the train stopped, when I heard the air escaping. My van did not get off the rails, and I was not aware that any vehicle was off the rails before we had stopped. I was aware that something was wrong from the break going on, and from hearing stones thrown up against the under side of the van. I felt a sudden jerk back when the front van ran against the brickwork of the South-Eastern Railway bridge, which was immediately succeeded by our again shooting ahead. I did not hear any whistle. I did not attempt to put the ordinary screw break in my van on; we do not do so when the patent break is made use of. I don't know the time when the accident occurred. After letting the passengers out, and ascertaining from the driver that he had sent his fireman ahead, I then went back to protect the rear of my train. The van next the engine was off the rails and had turned round and fallen over on its left side, and was lying on the down main line: it had separated from the tender in front, and also from the carriage behind it. The composite next to the front van was also off the rails to the left, was standing on its wheels, and had ran into the bank. The next vehicle, a first-class, was also off the rails to the left, but remaining coupled to the composite in front of it, and was still standing on its wheels. The next vehicle, a second-class, was still on the rails, and remained coupled to the first-class in front, and also to the first-class behind it, which, however, was off the rails, but that first-class remained coupled to my van. I was a little shaken, but nothing to speak of. I think the speed had been reduced to 20 or 25 miles an hour when I felt the jerk caused by the front van coming in contact with the brickwork of the South-Eastern Railway bridge. I did not hear any of the passengers complain of being hurt at the time.

William Collyer, signalman rather more than twelve months, states:—I was on duty at the Bickley ballast pit signal-box on the morning of the 29th November. I saw the engine of the 4.15 a.m. up boat express train from Dover stop short of my box, and the fireman at once came up to me at 6.41 a.m. and told me that the train was on its side, and that I was to block both ways and to telegraph to Stewart's Lane, London, for the break-down gang. The next down train was due at 7.6 a.m. I blocked both lines.

J. A. C. Hewitt, district engineer on the London, Chatham, and Dover Railway, states:—I got to the scene of the accident about 9 a.m., and commenced at once to examine the state of the line, and made notes of the condition of the train, and afterwards gauged the road, having discovered the breakages of the fish-bolts. I then walked back to the railway bridge to see what was the general damage to the line: after that, I walked towards Chatham, and observed marks on the inside of the flanges of both rails, especially on the low rail (the line being on a curve), evidence that something unusual had taken place. These marks were quite fresh. This continued more or less for about 200 yards. The first mark was about 384 yards east of the South-Eastern Railway bridge. 169 yards west of this first mark, I found that the nuts of two fish-bolts in the joints of the rails, opposite to each other, were both broken,—the first and the last in the left rail, and the two centre ones in the right rail,—evidently by a wheel striking the nuts and the inside flanges of three or

four chairs under the left rail had previously been struck and marked: that could not have been done, except by a wheel out of its proper position. The cross-beams of the under-bridge were heavily marked, most of them in two places. The next thing was that two rails were broken, both in the right rail. Nothing appears to have got outside either rail until the under-bridge was passed. There were two broken rails, 39 sleepers

had to be taken out and replaced, 110 chairs were broken, and 89 fish-plate bolts were also broken, and 160 keys had to be replaced. The permanent way was mostly damaged after the South-Eastern Railway bridge had been struck. The ballast pit signal-box is 36 chains east of Bickley station, and the engine stopped at 53 chains from the station, and from the station to the first marks on the rails is one mile and six yards.

From the preceding statements, and from an examination of the line on the ground, it appears that the 4.15 a.m. up boat express from Dover to London on the 29th November consisted of an engine and tender, break-van, composite, first-class, second-class, first-class, and another break-van at the tail of the train, arranged in the order in which they are now enumerated: that it was fitted throughout with Westinghouse's automatic continuous breaks, with the exception of the engine and the third vehicle from the tender (a first-class carriage), which only had a connecting pipe, but without any break-blocks or gearing under it. While this train was running at from 40 to 45 miles an hour the leading axle of the tender suddenly snapped and its wheels dropped off the rails, and the axle broke the connecting pipe of the break apparatus, and caused the automatic action of the breaks to be at once brought into play, which placed the break-blocks on the wheels of the vehicles fitted with them. The centre and trailing wheels of the tender and some other vehicle, including the leading break-van, shortly afterwards got off the rails, and the leading break-van came in contact with the left abutment of the bridge that carries the South-Eastern Railway over the London, Chatham, and Dover line.

The tender coupling broke from the shock, and the front break-van was then diverted from the left to the right side of the up line of rails, and then twisted round and fell over on its left side, 61 yards west of the abutment of the bridge which it had struck. The engine and tender ran on, and stopped about 180 yards from the same abutment. The engine remained on the rails.

On examining the ground after the accident had occurred, the first thing which attracted attention on the permanent way was found about 384 yards east of the South-Eastern Railway bridge, in the shape of fresh marks on the inside of the flanges of both rails, recurring at intervals, especially on the low rail, the line at that part being on an easy curve to the left, of 72 chains radius. These marks continued for about 169 yards forward, where two fish-bolts out of four that secured two opposite joints in the left and right rails were found broken, the nuts having been struck by wheels, and the second chair ahead of the joint under the right rail was also broken; and the second and third chairs from a joint on the left rail at 209 yards from the first mark were also broken. Up to this spot, and 100 yards beyond it, marks of wheels on the chairs could be traced between the rails, but nothing could be seen of any wheel marks outside the rails. At 309 yards a chair under the left rail was found broken, and at 317 yards an under-bridge was reached, where the seven cross-beams that carried the chairs and rails were all heavily marked, and five out of the seven had two marks on each beam, about two feet apart, between the rails.

At 332 yards from the first mark, chairs under both rails were broken, and at 354 yards a rail was found broken into three pieces, the centre piece being about two feet nine inches in length, and at 372 yards a second broken rail was found, both broken rails being in the right rail. A wheel mark outside the left rail was found at 352 yards, and these marks outside the left rail continued up to the South-Eastern bridge, where the leading break-van came in contact with the south abutment of the bridge. The two next vehicles to the front break-van were also off the rails to the left, but the fourth and sixth vehicles from the tender remained on the rails, while the fifth vehicle, a first-class, was also off the rails to the left when the train stopped, and that vehicle had the right wheel and part of the leading axle of the tender under it. The last five vehicles remained coupled together, but separated from the front break-van, which lay on its left side on the down main line, with its leading end turned round towards Dover.

From the marks on the permanent way, it appears that the leading axle of the tender broke, but still ran on the rails for a distance of 169 yards, and then both wheels dropped off the rails, and broke two bolts out of four of two fished joints opposite to each other, and the axle broke the connecting pipe of the continuous break apparatus, and brought the automatic action of the breaks into operation; while by the dropping down of the leading end of the tender, notice was at the same time given to the engine-driver that the tender was partly off the road, and he at

once opened the valve for the application of the continuous breaks, which, however, had already been put into operation by the automatic action.

The right wheel on the right half of the leading axle of the tender seems to have got entirely under the tender before the under-bridge was reached, and it appears to have been trundled along under the several vehicles, destroying the air cylinders and break-work fitted to each of them, up to and including that under which it was finally found (the last vehicle but one in the train) when the train stopped.

The break-blocks were found applied to the wheels of the last break-van, and probably had also been applied to the other vehicles until the break-work and air cylinders were broken. As soon as the train stopped, the driver very properly sent his fireman forward to the ballast pit signal-box, situated about 36 chains east of Bickley station, and 17 chains from where the engine stopped, to tell the signalman to block both lines.

The engine No. 53 (Europa) of the up boat express train is a six-wheeled, four wheels coupled, engine, having 17-inch cylinders and 24 inches stroke, the leading wheels being 4 ft. 6 in. in diameter, and the driving and trailing (coupled) wheels 6 ft. 6 in. in diameter, the distance between the centre of the leading and driving wheels being 7 ft. 9 in., and that between the driving and trailing wheels 8 ft.; the weight of the engine being 34 tons 11 cwt. in working order. The tender has six wheels 4 ft. in diameter, with a space of 6 ft. 6 in. between each pair of wheels and of 8 ft. 4½ in. between the trailing wheels of the engine and the leading wheels of the tender; its weight being 21 tons 6 cwt.. The total length of the engine and tender being about 48 ft. 3⅞ in. over the buffer ends. The whole weight of the train was about 114 tons 7 cwt., and the break apparatus was fitted to 69 tons 16 cwt., or about 61 per cent. The axle which broke is of iron, and the fracture occurred about 3½ inches from the centre, where its diameter is 4½ inches, the diameter at the boss of the wheel being 6½ inches. The fracture showed that a flaw extended right across the centre of the metal, and within a very short distance of the exterior on each side (see drawing). It was made by Hawthorn of Newcastle, but its early history is not known, nor the mileage which it had run. The engine was last in the shops for repairs from 14th June to 22nd August of this year, and the foreman who examined the state of the tyres on the wheels and the axles on this tender described the latter as being "good." Since the engine came out of the shops it has run 7,589 miles up to the time of the accident.

In this case there is no doubt whatever that the accident was occasioned by the breaking of the leading axle of the six-wheeled tender, which allowed the leading end of the tender to drop down about 4 inches, the space on the foot-plate between the engine and tender being about 7 inches, which was covered by a flap attached to the tender of about 13½ inches in width. This flap was tilted up when the tender's leading wheels dropped off the rails and broke the break pipe, and gave notice to the driver.

The effect of the automatic action of the breaks, coupled with the retarding force exercised by some wheels being off the rails, was, it is estimated, to reduce the speed from 40 or 45 to 25 miles an hour, when the leading break-van struck the abutment of the South-Eastern Railway bridge, in running a distance of about 215 yards from the spot where the fish-bolts were broken, and where the leading wheels evidently left the rails. It must, however, be recollected that the automatic action of the breaks under each vehicle was in process of being destroyed in succession, as the broken axle and wheel passed under each vehicle.

No blame attaches to any of the company's servants, and it is most fortunate that the accident was not attended with very serious results. The guard in the leading break-van must have had a very narrow escape.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
W YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 30th December 1878.

MANCHESTER, SHEFFIELD, AND LINCOLNSHIRE RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., 16th November 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 12th instant, the result of my inquiry into the causes of a collision which occurred on the 9th instant at Ardwick, on the Manchester, Sheffield, and Lincolnshire Railway.

In this case, as the 11.25 a.m. up Midland passenger train from Manchester was approaching Ardwick station the position of the facing-points of a goods line junction at Ardwick was altered, and the train, running on to the up goods line at about 20 miles an hour, came into collision, at about 11.32 a.m., with a Midland light engine, which was standing on this line about 120 yards from the junction points.

The passenger train was made up as follows: engine and tender, front break-van, one third-class, one bogie composite, and two composite carriages, and rear break-van.

The engine was a four-wheel coupled bogie engine, and was, with the tender, fitted with Smith's vacuum break, having one cast-iron break-block on each of the four coupled wheels, and one wooden block on each of the six tender wheels.

The other vehicles in the train were fitted with Saunders' vacuum break, but were not connected with the engine, and this break was therefore not in use.

Ten passengers in all have complained of injuries received in this collision, but it is stated that none of these are seriously hurt.

The two drivers and their firemen were injured, the fireman of the passenger train so badly that one of his arms has since been amputated.

Both engines were thrown off the rails, the bogie of the passenger engine was knocked off, and the light engine was thrown over on to its side.

No other vehicles were off the rails.

A return, showing the weights of the engines and other vehicles, and the damage to each is attached.

Description.

Ardwick station is about three-quarters of a mile east of London Road station at Manchester, the intermediate signal-boxes being at London Road junction, Buxton Street, and Ardwick old junction, situated respectively 976 yards, 267 yards, and 136 yards west of Ardwick No. 1 signal-box, which works the station signals and the goods lines junction.

The Manchester, Sheffield, and Lincolnshire main line, over which the Midland Railway Company have running powers, and the London and North-Western Railway Company's line to Crewe run parallel to each other, for some distance quite straight, and then on an easy curve to the south of 180 chains radius up to Ardwick old junction, where the latter line diverges towards the south. From this point the Manchester, Sheffield, and Lincolnshire line is straight for about 60 yards, half-way along Ardwick up platform, and then curves slightly to the north.

Ardwick No. 1 signal-box is at the east end of the up platform, and at the west end of the down platform, and the junction of the double goods line, which diverges towards the north on a curve of $12\frac{1}{2}$ chains radius, is 13 yards west of the signal-box, the facing-points being on the up line.

This signal-box contains 15 levers, of which No. 2 works a slot on the Ardwick old junction up home-signal, No. 3 works the locking-bar and bolt, and No. 5 the facing-points of the goods line junction, No. 6 the up main home-signal, and No. 7 the up goods line home-signal. Nos. 3, 5, 6, and 7 are interlocked, but No. 2, which works the slot, acting as the up distant-signal, is free.

The post carrying the up home-signals is opposite to the points.

There is a good view of these signals, but owing to the curve of the goods line, and some vehicles, which were standing on some sidings, the point of collision, about 120 yards from the junction points, was not visible on this occasion from the engine of the Midland train for more than 70 yards.

The goods line falls towards the junction on a gradient of 1 in 173, and the main line falls towards Manchester on a gradient of 1 in 382.

Block telegraph working is in use from Ardwick No. 1 signal-box onwards, but between London Road junction, Ardwick joint or old signal-box, and Ardwick No. 1

signal-box station yard, working with a bell communication and code of signals, is in force.

The following rule bears upon this case :—

“Up Manchester, Sheffield, and Lincolnshire trains requiring to pass Ardwick without stopping.

“The Buxton Street and Ardwick old junction up train (Manchester, Sheffield, and Lincolnshire) signals must not be lowered until the up home-signal at the Manchester, Sheffield, and Lincolnshire No. 1 junction box is lowered.”

Evidence.

George Bampton, Midland passenger driver, driver 19 years, states: On the 9th inst. I was driving the 11.25 a.m. up Midland express from Manchester, consisting of engine and tender and six vehicles, including two break-vans, one next to the tender and one at the rear of the train. My engine is a four-wheel coupled bogie, and I was running chimney first. My engine was fitted with Smith's vacuum break, with wooden break-blocks on the six tender wheels, and cast-iron blocks on the four engine coupled wheels, one block to each wheel. The other vehicles were not fitted with Smith's vacuum break. We left Manchester at about 11.26 a.m., nearly one minute late. The signals were right until approaching Buxton Street, where I had to slacken for the distant and home signals. When about half-way between the distant and home signals the home-signal was lowered for me, and I proceeded. At the same time I could see the signals off at the London and North-Western junction (or Old Ardwick junction), and also at Ardwick No. 1. I proceeded and was going from 16 to 20 miles an hour when passing Ardwick station platform. I am certain that Ardwick junction up home-signal was off at that time. I had passed the Ardwick old junction home signal-post, and it was off. When I arrived within about 10 or 15 yards of the facing-points of the goods line junction the up home-signal was thrown up against me. I mean that the front end of my engine was that distance from it. I did not notice the points altered, nor could I see whether they had been bolted for the goods line, but I was turned on to the goods line. The moment I discovered what had happened I shut off steam and applied my breaks. Before I did this I looked across at the signal-box, but the signalman did not give me any signal whatever that anything was wrong. At that time I was running under 20 miles an hour, from 18 to 20 I should say. As soon as I got a little round the curve I saw an engine on the goods line in front of me; but almost as soon as I saw it I was into it, running from 10 to 12 miles an hour at the time. Both engines were thrown off the rails, the bogie of my engine was knocked off, and the other engine was thrown on to its side. There was only one other vehicle of my train, if any, off the rails. I jumped off my engine after the collision. I had been thrown against the fire-box and was badly shaken. My fireman was very badly hurt, and his arm has since been amputated. I did not sound my whistle for the guard's breaks as I had no time. I know that the points and signals are interlocked, and that the signal must have been thrown up, and the locking-bolt withdrawn, before the points were altered. I do not think that, at the speed I was going, I could have stopped the train even if it had been fitted throughout with continuous breaks. I did not think that the fact of the signal being thrown up at such a short distance indicated danger. I thought that it was merely that the signalman had thrown it up a little sooner than he ought to have done, instead of waiting, according to the rule, until the tail of my train had passed. I thought from the signalman not looking at me that he knew he was wrong. From where I was standing on my engine I could not see the locking-bar of these points. The position I pointed out this morning on the ground was as nearly as I can judge the exact spot where I first saw the signal thrown up. My fireman had been firing when

we were approaching Ardwick. The last I saw of him he was sweeping up. I do not think he saw the signals. I am certain my breaks were applied and acted well, being in good working order.

Thomas Wilson, Midland guard eight years, states: On the 9th inst. I was guard of the 11.25 up express from Manchester, consisting of engine and tender, front van, one third-class, one bogie composite, two composite carriages, and rear van. I was riding in the front van and another guard in the rear van. We left Manchester at 11.25½, about half a minute late. I did not pay any attention to the signals, nor did I notice that we slackened speed at Buxton Street. I did not know anything was wrong until I observed that we were running on the goods line at Ardwick junction. We had passed under the overbridge at this time, and almost in a moment the collision occurred. I did not feel the engine breaks go on, nor was there any whistle for my breaks. I would, however, have applied my break if I had had time without any whistle, for I knew we were on the wrong line. As it was, I was knocked over before I had time to do anything. I do not know the exact time of the collision. None of the carriages or vans were thrown off the rails. I got out and attended to the passengers. Several of them complained of injury, and I saw one gentleman cut about the face. One lady was a good deal shaken and returned from Marple. All the others proceeded on the journey. I do not think there was anything unusual in the speed at which we were approaching the junction, it must have been about 20 miles an hour. I did not notice any perceptible reduction of speed before the collision. I had spoken to the driver both before and after the accident, and he was perfectly sober. I was occupied in making out the journal, and so did not observe the speed or the signals. I knew that the train was not being worked with a continuous break throughout, because the carriages were fitted with Saunders' break, and the engine with Smith's vacuum break, the proper engine being under repair.

George Freeman, Manchester, Sheffield, and Lincolnshire signalman six years, all the time at Ardwick No. 1 box, states: On the 9th November I came on duty at 6 a.m. for an eight hours shift. At 11.21 a.m. a train of Manchester, Sheffield, and Lincolnshire empty coaches arrived from Manchester to go on to the up goods line. They could not do so because there were some Midland coaches shunting in the goods yard. The engine was therefore uncoupled and sent across through the slip road on the main passenger line back to Buxton Street, to come and take them across on to the down line through the same slip, and into the down goods sidings, to get them out of the way of the 11.20 a.m. Sheffield train. This operation was finished at about 11.25 a.m. When the up line was clear I took my slot off the Old Ardwick up home-signal, and this empowered the Old Ardwick signalman to take the slot off the Buxton Street signals. The Sheffield train arrived at Ardwick platform at 11.26, and left at 11.27, and was cleared from No. 3 box at 11.29. At the time it was standing at the platform I received the bell signal from London Road for the Midland up express, and I acknowledged it, and when the Sheffield train was cleared from No. 3 box at 11.29 I gave "Train on line," and "Be ready"

at the same time for the Midland train. I remember taking off my slot on the Ardwick old junction up home-signal for the express, but I do not remember taking off my junction-signal. There was no reason I should not have done so, but if I did I think I must have put it up again at once. A down train arrived at the down platform at about 11.29, having been stopped at the stop signal at the same time that the Midland is due to pass my box, and this took my attention off the Midland train. I do not remember anything more about this train after taking my slot off until I saw it passing my box on the goods line. I remember pulling over the goods line points just as the down train was moving off. It must have been nearly or quite past my box at the time. I did this to allow a Midland engine to come out on the up goods line, and set back on the down goods line, to bring out a train of empty coaches. This was a little after 11.29 a.m. I had forgotten about the Midland express being due, or I would not have done so. Before I could set the points right for the goods line it was necessary for my up home-signal to be at danger. The slot on the Old Ardwick up home signal-post may be off when these points are set for the goods line. I think I must have thrown my up home-signal to danger at the same time as I put back the down home-signal to danger, when the down train had passed my signal-box at 11.29 or a little after. I cannot say where the Midland express was then, but when I gave it on to Ardwick No. 3 it had not arrived at Buxton Street. The line was quite clear for me to have seen the Midland express had I looked in the Manchester direction. I cannot estimate the speed at which the express was running past my box, but I do not think it was excessive. When I saw it I was upset. I knew the other Midland engine was on the up goods line for I was preparing to let it out. I did not see the Midland train approaching or until it had got on the wrong line. It is my duty to put my slot on the Ardwick old junction up home-signal before I let anything come out of the up goods line, but I cannot say whether or not my practice is to do so before altering the points. The putting back of the No. 2 lever in my box working the slot throws the Ardwick old up home-signal to danger.

William Freeman, Manchester, Sheffield, and Lincolnshire ticket examiner, states: I am brother to the signalman at Ardwick junction No. 1. On the 9th November I was coming from Ardwick to London Road station, in the Staleybridge down train, which arrived at Ardwick a little before the accident occurred. I was riding in the front van, and we met the Midland express just as the van was passing under the signal bridge at Buxton Street signal-cabin.

Isaac Millett, London and North-Western relief signalman, states: On the 9th November 1878 I came on duty at 6 a.m. in the Ardwick old junction signal-box, for an eight hours shift. The Midland up express passed my box at about 11.31 as near as I can remember, running about 15 miles an hour. At that

time there was a down train standing at Ardwick platform, and this train passed my box towards Manchester about two minutes after the Midland train had passed. My up home-signal, which is slotted from Ardwick No. 1, was at danger when the Midland train was about 200 or 300 yards the other side of Buxton Street, and my slot on the Buxton Street signals was also on. The slot on my up home-signal from Ardwick No. 1 was not on, but I saw his up home-signal at danger, and therefore I kept my up home-signal at danger. As soon as he took his up home-signal off I lowered mine, and took my slot off Buxton Street, and at that time the Midland train was 200 or 300 yards beyond Buxton Street. I did not look at the Ardwick up home-signal again until after I heard the collision, and it was then at danger. My signal was all right when the Midland train passed my box.

John Davenport, London and North-Western and Manchester, Sheffield, and Lincolnshire signalman, states: I came on duty on November 9th at Buxton Street signal-box at 6 a.m. The Midland up express passed my box at about 11.30 a.m., having been slackened outside my home-signal, running about 10 miles an hour. The Staleybridge down train did not pass my box till about two minutes afterwards.

Peter Gee, Manchester, Sheffield, and Lincolnshire driver, states: I was driving the Staleybridge 11 a.m. down passenger train on the 9th November. We met the Midland up express just on the crossing of the Lancashire and Yorkshire line. I mean my engine and the Midland engine met at this point.

John Wright, fireman to the above, states: We met the Midland express just opposite to the Buxton Street signal-box.

Henry Ashton, Manchester, Sheffield, and Lincolnshire guard, states: I was guard of the Staleybridge train on the 9th inst. I was in the rear van, and the engine of the Midland up express passed my van when it was about half-way between the Lancashire and Yorkshire crossing and Ardwick up platform. There were seven vehicles in the train exclusive of engine and tender.

Mr. Daniels, Manchester, Sheffield, and Lincolnshire station-master at Ardwick, states: After the collision I went to examine the site, and I found the break-blocks on the tender were off. I did not notice those on the engine till some time afterwards, they were then off. I did not notice anything about the coupling between the engine and tender, but I do know that if the coupling was disconnected, the break-blocks would of course be off.

Mr. T. Harding, Midland locomotive foreman, states: When I examined the engine after the collision I found the break pipe between engine and tender broken by the collision. I know it had been in good order before. From the effects I should say the collision had been a very violent one.

Conclusion.

This collision was clearly due entirely to the carelessness of the Manchester, Sheffield, and Lincolnshire signalman in Ardwick No. 1 signal-box, who admits that, having forgotten all about the Midland up express, he turned the facing-points of the goods line junction to lie right for the up goods line, when the Midland train was due or nearly due, and had been signalled to him from London Road. He states that he did so in order to let a Midland engine come out on to the up main line, and across on to the other line, to fetch out some empty carriages, and he acknowledges that it is contrary to his instructions to have done this when the Midland train was due.

There is considerable discrepancy in the evidence produced as to the exact time at which this man threw his up home-signal at danger, which he was obliged to do before he turned the points. He is himself rather uncertain about it, but states that

he turned the points just as a Manchester, Sheffield, and Lincolnshire down train had moved off, past his signal-box, from the Ardwick down platform.

The driver, fireman, and guard of this down train, and a ticket collector, the brother of the signalman who was in the train, give evidence to the effect that they met the Midland express some distance on the Manchester side of the junction, and if this were so, and the signalman's statement as to the time he turned the points be correct, the up home-signal must have been against the Midland express some time before it arrived at the junction, and the driver of this train would be much to blame.

The evidence, however, of these men does not agree, the driver and the guard fixing the point at which they met the Midland train at about 160 yards, and the other two men fixing it at 260 yards and 300 yards west of the junction, while the evidence of the London and North-Western signalman in Ardwick old junction box, and of the Manchester, Sheffield, and Lincolnshire signalman in Buxton Street box directly contradicts it, and tends to prove that this down train had not moved off when the Midland train passed their signal-boxes. I consider, therefore, that the statement of the Midland driver, that the up home-signal was thrown up in his face when he was close on to it, is probably correct, although his estimate of the distance at 10 or 15 yards is certainly too little. I ascertained by experiment that the process of putting the signal to danger and altering the points takes about $2\frac{1}{2}$ seconds, in which time the Midland train would have run about 24 yards, but it may fairly be assumed that the engine of this train was very little, if anything, over 30 yards from the points when the signal was thrown up to danger. The distance, therefore, available for the driver to stop in was about 150 yards, which was quite insufficient with the breaks at his command.

He ought, however, *at once* to have applied his breaks, and whistled for the guards breaks, instead of waiting till he found that he was on the wrong line, and so losing valuable time. He states that he "*did not think that the fact of the signal being thrown up at such a short distance indicated danger,*" but "*that it was merely that the signalman had thrown it up a little sooner than he ought to have done.*" There is no doubt that it is a very common, though very reprehensible, practice among signalman to disregard the rule that they must wait until the train has passed before they put back the signal to danger, the line being clear; but it would be a most dangerous thing to admit that a driver may use any discretion whatever in such a case, or may do anything but consider a signal thrown up to danger to mean danger, and act accordingly without a moment's delay.

It should be remarked that if the continuous breaks on this train had been connected and in working order, their use would probably have resulted in the stoppage of the train in time to avoid the collision altogether, but unfortunately the Midland engine fitted with Saunders' break, which usually works this train, was under repair, and another engine, fitted with Smith's vacuum break, had to be attached to the train, thus rendering it impossible to work the continuous breaks throughout.

So long as the question of continuous breaks remains in the present experimental stage such accidents will occur, and it is to be hoped that the Midland, as well as other railway companies, will soon come to some decision in the matter, and adopt one efficient break for all their stock.

Another point to which attention should be called, although it does not actually bear on the present case, is that this goods line junction cannot be considered as being sufficiently protected by signals according to the present requirements, for it ought certainly to be provided with a distant as well as a home-signal interlocked with the points. I would recommend that the interlocking should be altered so that the lever working the slot on the Ardwick old junction up home-signal, which acts as an up distant-signal for the junction, must be preceded by one or other of the home-signals, and so be interlocked with the points, and that, as this distant-signal is only 136 yards from the junction, a new up distant-signal should be put up at or near Buxton Street signal-box to act both for Ardwick old junction and Ardwick No. 1 box. Safety-points should also be inserted as usual on both the goods lines.

*The Secretary,
(Railway Department),
Board of Trade.*

I have, &c.,
F. A. MARINDIN,
Major R.E.

APPENDIX.

MIDLAND RAILWAY.

Collision at Ardwick on November 9th, 1878, particulars as to weights of and damage to rolling stock.

Engine and tender, No. 1,313, in working order.

	Tons.	Cwt.	Qrs.	Tons.	Cwt.	Qrs.
Leading wheels	13	4	2			
Driving wheels	15	1	2			
Trailing wheels	12	7	1			
	<hr/>			40	13	1
Tender	-	-	-	29	15	1
	<hr/>			70	8	2

Left-hand frame broken through near front buffer plank, both inside frames strained, outside quarter plate and foot-plate badly bent.

Bogie forced from underneath and damaged, and bearing casting and centre pin broken.

Cylinder and steam chest covers broken.

Motion strained.

Left-hand leading buffer broken off, plank broken through, and life-guard damaged.

Vacuum break pipes and gearing broken.

Tender not damaged.

Engine and tender, No. 905, in working order.

	Tons.	Cwt.	Qrs.	Tons.	Cwt.	Qrs.
Leading wheels	12	0	2			
Driving wheels	11	12	3			
Trailing wheels	10	12	3			
	<hr/>			34	6	0
Tender	-	-	-	23	14	2
	<hr/>			58	0	2

Safety valves, levers, and balances broken.

Smoke-box knocked in.

Leading buffer plank broken.

Cylinders broken.

Right-hand outside frame bent.

Motion of engine damaged.

Feed pipes, life-guards, and hand-rails damaged.

Westinghouse air break, engine pipes, and connections badly damaged.

Vehicles.

Description.	Tons.	Cwt.	Qrs.
Passenger van, No. 36	-	8	4 0
Third-class carriage, No. 502	-	6	17 0
Bogie composite, No. 667	-	22	19 0
Composite, No. 293	-	10	5 0
Composite, No. 709	-	10	5 0
Passenger van, No. 366	-	8	1 1

Leading van, No. 36.—One buffer casting broken and buffer rods bent.

Third-class carriage, No. 502.—Head-stock, one end of body, one buffer casting and coupling all broken at rear end, and buffer rods bent.

Bogie composite, No. 667.—One head-stock, one centre buffer, two side buffers, one end panel, and two quarter lights at the leading end broken.

Composite, No. 293.—One buffer casting broken and buffer rods bent.

Composite, No. 709.—One buffer bent, and one light broken.

Rear van, No. 366.—Not damaged.

S. W. JOHNSON.

Printed copies of the above report were sent to the Company on the 11th December 1878.

MANCHESTER, SHEFFIELD, AND LINCOLNSHIRE RAILWAY.

Board of Trade, (Railway Department,)

11th December 1878.

SIR,

IN compliance with the instructions contained in the Order of the 30th ultimo, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances connected with the collision that occurred on the 26th ultimo, at the east side of the Mexborough station, on the Manchester, Sheffield, and Lincolnshire Railway.

The passenger train due to leave Doncaster at 5.50 p.m. for Mexborough and Sheffield ran into a goods train which was drawn up about 250 yards inside the Mexborough distant-signal.

The guard of the passenger train and two passengers are returned as having been hurt.

The engine of the passenger train was damaged, but no part of this train left the rails. Three waggons and the guard's van at the tail of the goods train were damaged and knocked off the rails. The permanent-way was not damaged.

The goods train consisted of an engine and tender, 30 empty waggons, and a break-van at the tail of the train, in which the guard in charge had been travelling. This train came from Grimsby. It was stopped when the van was about 250 yards inside the Mexborough distant-signal as the Mexborough station was blocked by trains being in front of the goods train.

The passenger train consisted of an engine and tender, a third-class carriage with a break-compartment, four passenger coaches, and another third-class carriage with a break-compartment, in which the guard, who was in charge, was travelling. This train left Doncaster at its proper time (5.50 p.m.), and was timed to stop at Conisborough and Mexborough stations. This latter station is about three miles from Conisborough. It is protected with the ordinary home and distant signals, which are good signals, and

can be well seen at ordinary times, but on the night in question there was a dense fog, and men had been posted at the home and distant signals with fog-signals. The line as it approaches Mexborough is perfectly straight, and the station is situated on a slightly rising gradient. The line to the west of Mexborough is worked on the block system. This work is in progress, but has not yet been carried out east of Mexborough station.

The evidence is as follows :—

Evidence.

1. *George Turner* states : I was driver of the goods train from Grimsby to Mexborough on the 26th November. Before we reached Conisborough station a very thick fog came on, and on passing the station I saw the signalman on the platform, who showed me a green light. I knew that the Liverpool passenger train was in front of me. On arriving at the Mexborough distant-signal I ran over two fog-signals, and saw the fogman, who was holding out a red light to me, as the distant-signal was at danger. I drew my train quietly inside the signal till I saw the red light of the Liverpool train, which was standing in front of me. This Liverpool train drew up shortly afterwards, and I drew up about a waggon length or two. While I was standing there the guard of my train came up, and the fireman asked him why he had not gone back to protect the train, and he said he had been and put down two fog-signals, and he stated that he had seen the fogman go back further still. While the guard was standing close to my engine, and had one foot on the step, the collision occurred, and my train was run into by the passenger train of the Manchester, Sheffield, and Lincolnshire Company, which came from Doncaster and was going to Sheffield. I felt the collision on my engine, which was pushed forward close on to the Liverpool train, and I reversed my engine so as to keep clear of the Liverpool train, and at this time I felt a second collision. I believe three waggons and the guard's van at the tail of the train were knocked off the rails. I left the waggons that were knocked off behind, and got away with my train about 40 minutes afterwards. The fog was very thick at the time of the collision. The collision occurred a few minutes past 6. I was behind time with my train. I had been stopped at Hexthorpe, waiting for the Liverpool train, which preceded me. I heard two fog-signals go off immediately before the collision. I think they could not be far from the tail of my train, but they might be as far as the distant-signal. I have been a driver 25 years.

2. *George Cross* states : I was guard of the goods train which is booked to leave Grimsby at 11.40 for Mexborough. When I passed Conisborough the signals were all right. On approaching Mexborough my train was brought to a stand when my van was some distance inside the distant-signal, at the place where I showed you that the waggons were off the line. I passed a fogman who was standing outside the distant-signal. He showed me a red light, and called to me to put my break on. I did not observe the distant-signal as I passed it. The fog was very thick. I did not hear any fog-signals go off as my train passed. As soon as my train pulled up I got out of my van and went back to protect my train. I put down two fog-signals about 60 yards from my van, and two more about the distant-signal, where I saw a fogman. I told him the time, and he said "The passenger train is shortly due," and he went back further to protect the train. This fogman was not the one I had seen as my train approached Mexborough. The one I had seen was still further out. I returned to my train for the purpose of seeing it was all right, and went up to the engine, and said to the driver, "You pulled up rather sharp." He said, "Yes ;" and one of the men on the engine asked me why I had not been back to protect my train. I told him I had done so, and put down fog-signals, and seen the fogman, and he had gone back to make all

right. Immediately after this I heard some fog-signals go off, and then the collision occurred. My train consisted of engine and tender, 30 empty waggons, and my break-van at the tail of the train, in which I had been riding. As soon as I heard the collision, I went back to the tail of my train, and found two or three waggons and the break-van had been thrown off the road and damaged. They had been run into by the passenger train from Doncaster to Sheffield. No part of the passenger train was off the road. I then went immediately to Mexborough and told them that the line was blocked, and then went back to Denaby (which is between Mexborough and Conisborough) and told the signalman there not to let anything pass until he had written instructions, as both lines were blocked. We arrived outside Mexborough at 5.55, and were due at 3.20. We were late, owing to delays in consequence of the fog. I went away with my train as soon as I could afterwards, leaving the broken waggons behind. I have been a guard 8 or 9 years.

3. *John Durose* states : I am a platelayer, and about 5 o'clock on the 26th November I was ordered to go out to the home-signal at Mexborough to stop there to apply fog-signals. As the trains came up and got stopped outside Mexborough, I worked my way down towards the distant-signal, and at the time that the goods train from Grimsby arrived I was between the home-signal and the distant-signal, and I spoke to the guard, who told me he had put down two fog-signals, and I said "I must go and put some more down," as the passenger train was about due. I had asked the guard the time. I then went and put two fog-signals down about 150 yards behind the goods train, and at the Mexborough side of the distant-signal. I then walked towards the distant-signal and stood about 40 yards at the Mexborough side of it, and held out a red light to the passenger train, which was approaching, with steam on. It was going very fast. I should think it was going 30 miles an hour. I could not see the distant-signal where I was, but it was always kept on in foggy weather. A fire was close to it. There was another fogman outside me. I could not see him, but I knew he was there, and I heard a fog-signal go off as the passenger train approached me, and there were four went off after it passed me before it struck the goods train. The other fogman's name is Lockwood. He is one of my gang. The driver came up to me after the collision. I did not know who he was, but he said "Come back with me ; I want to know why no fogs have been put on," and he asked where the fogman at the distant-signal was. I told him he was below somewhere, and I went back with him until we met the man. I can hardly tell how far this was back from the distant-signal. The driver said he had put no fogs on, and the man said he had. The driver then put his lamp on the rails, but neither of them found a fog-signal. They did not stop very long looking for the signals. I have been about 14 months in the railway employment.

4. *William Lockwood* states : I am a platelayer in the Manchester, Sheffield, and Lincolnshire Railway Company's service. I was sent out to fog on the 26th November at the Mexborough distant-signal. When the Mexborough goods passed me I was about 40 or 50 yards to the east of the distant-signal. I had

put down two fog-signals which had exploded when the goods passed, and I showed the driver of the goods train a red light as he passed. I was aware that the goods-train had pulled up somewhere between the distant and the home signal. I then went back about 150 yards further east and I put down two more fog-signals. About eight or nine minutes after the goods train had passed me I heard the passenger train approaching, and I thought, from the beat of the engine, it was going rather fast, so I walked towards it and held out my red lamp. I called to the driver to pull up, as there was a train in front of him. I heard the two fog-signals that I had put on explode, and I heard three more afterwards before I heard the collision, which took place immediately afterwards. After the collision, the driver of the passenger train, and the fogman who had been fogging nearer Mexborough than where I was stationed, came up to me, and the driver asked me where the fog-signals were, and I told him he would find them by the side of the rails if he would look. I then went further east to stop any more trains. When Mr. Halmshaw came to me I showed him where I had put the fog-signals, and picked up two at the spot which had exploded. I do not recollect that any trains had passed since the passenger train that met with the accident at the time Mr. Halmshaw came to me. I did not see the foreman shunter with the driver. I have been six years a platelayer in the Company's service.

5. *William Ulliyott* states: I was driver of the passenger train from Doncaster to Sheffield on the 26th November. I left Doncaster at the proper time (5.50 p.m.), and I stopped at Conisborough. As I was pulling up at the platform the signalman made the remark to me "Let off," which means that the line was all clear. I know that the line is not worked on the block, and that the rules are to give a caution-signal for 10 minutes after another train has passed, and as I got no caution-signal I did not think there was anything between me and the Liverpool passenger train, which I knew was due to leave Doncaster at 5.35. My train consisted of engine and tender, break-van, four passenger coaches, and another break-van at the tail of the train with the guard in charge. I think we were about a minute late in leaving Conisborough. As we passed Denaby, which is about a mile and a quarter east of Conisborough, I noticed the signals, which were all right, and the signalman showed me a white light from his hand-lamp. I did not see the Mexborough distant-signal, the fog was so thick, nor did I see any fogman between that and Denaby, but after passing the Mexborough distant-signal we ran over two fog-signals which were about 75 to 100 yards from the goods train which we ran into. I think we were going about 10 or 12 miles an hour when we ran over the fog-signals, and eight or nine when we ran into the goods train. Immediately after the collision I took two fog-signals from my engine and ran back to protect my train. When I was standing about the distant-signal, Ramsden, who is foreman shunter at Mexborough, came up to me, and he went back with me towards Denaby, and there we found a man standing at the side of the line, and he said he was fogging. I said, "Why did you not put some fogs on for us," and he said he had done so. I then said, "Well, they are things that will tell for themselves," and he replied, "Look on the ground," which we did, but could not find any; and he said, "Look further down towards Mexborough." The fogman did not show me the fog-signals. I then made my way back to the train, when I met another fogman, but I did not take up any fog-signals till I got within about 75 yards of the goods train, when I picked up those that I had run over, and Ramsden was with me at the time. We shut

steam off soon after passing Denaby, and we were approaching Mexborough with steam shut off, as it was necessary to be cautious, owing to the dense fog. I was not hurt by the collision. The engine-buffers were broken, and the chimney and vacuum pipes damaged. When I ran over the fog-signals I had no steam on. My fireman put his break on, passing over the first fog-signal, and on going over the second I reversed; and as I did this my engine struck the van of the goods train. I have been a driver since the year 1865 with the Manchester, Sheffield, and Lincolnshire Railway.

6. *Henry Chatwin Clarke* states: I am fireman of the Manchester, Sheffield, and Lincolnshire engine No. 87, which ran into the goods train on the night of the 26th November. We stopped at Conisborough. The signals at Denaby were showing a white light. We could not see them well, but we could see a glimmer. The next thing that occurred was that we ran over some fog-signals about 100 yards from the goods train which we ran into. We had no steam on at the time we ran over the fog-signals. As we ran over the fog-signals I put on my break, and the driver reversed. We were going about 10 miles an hour when we ran over the fog-signals. My break was in good order. There was no time for the driver to whistle for the guard's break. I had a pain come in my back after the collision, but I was not knocked down or bruised by the collision. I have been five years a fireman.

7. *John Macrone* states: I was the guard of the passenger train which consisted of engine and tender, carriage-break, four other coaches, and another carriage-break in which I rode. We left Doncaster at 5.50, the proper time. We were two minutes late on leaving Conisborough, owing to there being a heavy fog and our running cautiously. On passing Denaby I observed the signals all right. The light showed dimly through the fog. I then went to the other side of my van to look out for fogmen and the signals, but I did not see either before I heard a fog-signal explode. This was about the distant-signal. I immediately went to put on my break, but the collision occurred as I was doing so. I was knocked off the break platform into the bottom of the carriage, and was very much shaken at the time. I only heard one fog-signal. I was looking out attentively for any signals that might be given, but I saw none, and only heard one fog-signal explode before the collision. I think we were going about 20 miles an hour when we ran over the fog-signal, but I cannot say whether the steam was on or not at the time. I think the speed was a good deal reduced between the time of running over the fog-signals and the time that the collision occurred. I have been a guard a little over 24 years.

8. *George Ramsden* states: I am foreman shunter at Mexborough station. On the night of the 26th November, at the time of the collision, I was engaged on the platform. When I heard the collision, I went to lock all the signals so as to prevent anything proceeding on the up line. After this I went down to the scene of the accident, and walked on from there to the distant-signal, where I found the driver of the passenger train, who had gone back to protect his train, as the guard was hurt. A fogman was at the distant-signal, and the driver asked him where his fogs were, and he pointed that they were on the rails where we stood, and we proceeded up towards Mexborough and found three fogs about 75 yards from the collision. I went a little beyond the distant-signal with the driver, but I did not go to where the second fogman was posted. There was a small fire at the side of the distant-signal. I have been eight years a foreman shunter.

Conclusion.

It appears from the foregoing evidence that the driver of the passenger train received "all right" signals at Conisborough and at Denaby sidings, which latter are

about a mile and a half east of Mexborough. He stated that after leaving Denaby he got no signal at all, but ran over two fog-signals about 75 to 100 yards from the place where his engine struck the van at the tail of the goods train, and his evidence is borne out by the guard in charge of his train.

The guard of the goods train, which was run into, stated that when his train was brought to a stand he put down two fog-signals about 75 yards behind his train and two more near the distant-signal, and that he sent the fogman, whom he found at the distant-signal, further back to protect the train. This fogman, had originally been posted at the Mexborough home-signal, but owing to the accumulation of trains, consequent on the dense fog, he had gradually moved back as far as the distant-signal, and the man who had been posted at the distant-signal had moved eastwards towards Denaby. These latter fogmen stated that they had put down fog-signals and had shown a red light from their hand-lamps as the passenger train passed. Whether these men had put down the fog-signals, which they stated they did, to warn and stop the passenger train, I have been unable to determine. There is no doubt that two were put down about 75 to 100 yards behind the goods train, but the driver of the passenger train asserted that they were so close to where the goods train was standing that he could not possibly stop his train before striking the goods train.

The best security against accidents of the kind is what the Manchester, Sheffield, and Lincolnshire Railway Company are doing, viz., the continuation of the block telegraph system over their line, and a further and most material protection will be the adoption of continuous breaks.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. H. RICH,
Colonel, R.E.

Printed copies of the above report were sent to the Company on the 28th December 1878.

METROPOLITAN RAILWAY.

Board of Trade, (Railway Department,)
13, Downing Street, 7th November 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 21st ultimo, the result of my inquiry into the circumstances which attended the collision that occurred on the 19th ultimo, between the rear portion of a Great Northern goods train, which had become detached in the tunnel between Farringdon Street and King's Cross stations, on the widened lines of the Metropolitan Railway, and a following Great Northern down passenger train.

The company returns one passenger as having been injured on this occasion.

The damage to the rolling-stock was slight. One buffer-rod was broken and two bent, and one buffer casting and the body of the rear break-van of the goods train were also broken, as well as a coupling which caused the portion of the goods train to become detached.

The widened lines of the Metropolitan Railway dip down and pass under the Metropolitan Railway between Farringdon Street and King's Cross stations.

The descent from Farringdon Street is by a steep gradient of 1 in 40, in order to get under the Metropolitan Railway, and from thence it rises on gradients of 1 in 100 and 1 in 500 for the greater part of the way to King's Cross. The distance between Farringdon Street and King's Cross stations is about a mile, and the line is in tunnel for rather more than 50 chains of that distance.

The traffic is worked on the absolute block system, and there is an intermediate block telegraph signal-box between Farringdon Street and King's Cross stations, at a short opening in the tunnel at Granville Place, which is distant nearly 1,100 yards from Farringdon Street station. The down traffic at the intermediate signal-box is controlled by a down distant disc signal placed on the ground between the two lines of railway, 216 yards east of the down home-signal, which is fixed by a bracket to the crown of the tunnel at the western side of the signal-box.

The evidence in this case is as follows :—

Thomas Harrigan, driver of the Great Northern goods train from Battersea Yard to King's Cross on the 19th October, four years an engine-driver, states as follows :—I do not know at what time I left

Battersea. My train consisted of 16 waggons and two break-vans. They were all empties. Nothing out of the ordinary took place, but I was stopped at several places by signals. Was stopped at "C" box,

Farringdon Station, by signals at Farringdon Street, I suppose about one minute. After leaving Farringdon Street I came on slowly to Granville box. The distant and home signals stood at danger. I could not see the home-signal until I was within 20 waggons' length of it. I slackened speed, and I did not see it until I was about 10 waggons' length from it. The tunnel on that day was not clear. I slackened speed when I came in sight of the distant-signal, and upon reaching the home-signal it was taken off, and I did not come to a standstill. I put steam on gently, and went on to King's Cross. Upon reaching King's Cross (Metropolitan) I found the station-signal at danger, and stopped at it. I looked back at this time, and saw that I had no break-vans and not my full train. The signalman at the eastern or "C" box, King's Cross, came and asked me where I saw my break-vans last. I said that I saw them when coming down the dip after leaving Farringdon Street, before I entered the tunnel. The inspector then came and told me I was to go back slowly to take up the remainder of my train, and he rode back on my engine to Granville box, where I found the rear portion of my train, which had broken away, about 10 waggon lengths on the Farringdon Street side of the Granville box. I then had orders to proceed to King's Cross from the guard and inspector. I saw the distant-signal worked from Granville box when about 10 waggon lengths from it. A great deal of steam was in the tunnel. Immediately after passing the distant-signal I could see the home-signal at danger. When I started from the Granville box again there was nothing to intimate that I had left any portion of my train behind, and I was not aware I had done so until I arrived at King's Cross. I was almost at a stand when the Granville box home-signal was pulled off. I condensed steam in passing through the tunnel until I came into the open at King's Cross. A passenger train on the up journey passed us. I think it was a Great Northern passenger train going to Moorgate Street. I had not passed the Granville Street box when it passed. I think I reached King's Cross about 3 o'clock. I just caught sight of the side of the Granville Street box in passing it, but did not see the signalman in it. The distant-signal was on when we first saw it, and the home-signal was off when I first saw it. We slackened, but did not stop the train. I saw the signal-box, but it was very thick. I just saw it. I did not see the signalman. There was a light in the signal-box when we passed.

Thomas Rowley, fireman of the Great Northern goods train, corroborated the statement made by driver Harrigan.

Samuel Pearce, guard of the Great Northern goods train due to leave Battersea at 1.17 p.m., states:—I did not leave Battersea until 1.35 p.m. I arrived at Farringdon Street "C" box at 2.48 p.m., 52 minutes late, being due at 1.56 p.m. I left Farringdon Street station at 2.54 p.m. I had 16 empty waggons, two break-vans, and the engine. I rode in the last van. The driver slackened speed on approaching Granville box distant-signal, and went on slowly towards the home-signal. The driver then whistled sharply as a signal for starting, as I thought. The train had not been brought to a stand, but immediately afterwards I found we had stopped. I first found that we had broken away when on the King's Cross side of the distant-signal. The break-van had then passed this signal. I applied my break and called to my mate two or three times, and asked him if he knew we had broken loose. He answered, "No." I said, "You had better get out and run back to protect the rear part of the train, and put fog-signals down, and stop anything that may be coming;" and he went back. In the meantime I ran to the Granville signal-box and told the signalman that we had broken loose, and he replied that he had another train on. I told him my mate had gone back, if that was of any use.

I am quite satisfied that my van was stopped within the distant-signal, but I cannot say how far. My van did not run backwards at all. I got out of the break-van at 2.56. The collision did not take place until after I had got to the Granville box, but it was not a minute afterwards. I am of opinion that my mate went back at the same time that I went forward. We were pushed forward to King's Cross with the hind wheels of the rear break-van on the rails, the front pair being off the rails, caused by the buffers of the rear van being hoisted on to the frame of the first break-van. After speaking to the signalman at Granville box, I heard the report of three fog-signals, and immediately afterwards the collision took place. The rear part of my train was run into, as I have since ascertained, by a passenger train. The tunnel was rather thick and very full of steam. I saw the distant-signal just before my van reached it. I had a tail lamp lighted behind my rear break-van, and showing a good light. After the collision I found the light had been knocked out, and the lamp slightly damaged by the collision. I noticed that the lamp burned brightly when the train was running between Farringdon Street and Granville box. I do not know whether the driver was condensing or not. When I was going to the Granville box the steam was very dense, and appeared to be drifting towards Granville box from Farringdon Street. Six waggons and two vans were left in the tunnel when the front part of the train broke away. The front wheels of my van were lifted up by the collision, and the van ran forward on the rear wheels only. I had left the signal-box and was coming towards King's Cross when I heard the collision take place. I could see the signalman at the Granville Street box, but the steam was issuing from the top of the tunnel from Farringdon Street. I saw the signalman at the window, but I don't know whether the window was open or not. I spoke to him from the ballast. I saw him distinctly. There was no one with the train but my mate and the driver and fireman.

Henry Head, two years breaksman of the Great Northern goods train, states:—I rode in the first of the two break-vans at the tail of the goods train. I saw the two signals at Granville box, and that the distant-signal was at danger as we approached it. I saw it when we were about a train's length from it. The train had not come to a stand when the home-signal was lowered. I had seen the home-signal at danger. The driver whistled and then went on. My mate called to me and said we had broken loose, and told me to go back and protect the train, and then I went back and put three fog-signals down. I do not know how far we were past the distant-signal. I do not know how far I was away from the distant-signal when I heard the other train approaching, nor where I put down the fog-signals. After putting the fog-signals down, the engine passed me within half a minute, and ran into the rear of our train. I showed a red light when I ran back, but I cannot say if the driver saw it or not, as the tunnel was so full of steam. I could not see the approaching engine until it was close upon me. I think that the engine when it passed me was running at the rate of five or six miles an hour. I could not say if the driver was making any attempt to pull up. When I put down the fog-signals the distant-signal was showing danger, and a good light. I noticed when I got out of the break-van that our tail lamp was burning brightly. Our train consisted of 16 waggons and two break-vans. One was a box waggon. I think that the rear break-van was 15 yards within the distant-signal when we stopped. I think I went back about 20 yards from the rear of the last break. I had passed the distant-signal, and put the fog-signals down on the Farringdon Street side of the distant-signal.

Guard *Pearce* and breaksman *Head* both state that the box waggon was in the portion of the train that went forward to King's Cross, and that there were three or four private coal waggons behind.

William Bingham, driver of the Great Northern passenger train, a driver since February 1870, states :—I left Moorgate Street at 2.51 p.m. by my watch. We are due to leave at 2.50 p.m. I proceeded safely until I arrived at Farringdon Street, where I was checked by signals. I received the proper signals to start from Farringdon Street, and proceeded at about the usual speed towards Granville box. The tunnel was full of steam, and I was preparing to stop at the distant-signal. Just as we entered the tunnel from Farringdon Street we passed an up train. I did not see the distant-signal until we had struck the break-van of the goods train. The rear van of the goods train was standing about 15 yards outside the distant-signal. The force of the collision drove the waggons of the goods train forward up to the distant-signal, where my engine stopped. My engine was locked with the buffers of the break-van, and the front end of the second van was telescoped into the rear of the first. We were running at about five miles per hour at the time the collision occurred. I did not see the distant-signal either before or after the collision. About 10 or 15 yards before striking the van we ran over three fog-signals. I applied my engine vacuum break at once. The train itself was not fitted with this break. The steam had been shut off for about 200 yards before we struck the train. I had no time to give my fireman any instructions. I scarcely felt the collision at all; in fact, I was much surprised to see the amount of damage done after so slight a shock. The tank and rear portion of my engine were standing just opposite the distant-signal. Only two vacuum break pipes of the engine and the leading draw-bar hook of the front break-carriage of the passenger train were broken. I had two lights on the head of my engine, one white and the other purple. The tunnel cleared in about a minute after the collision. I saw the goods breaksman's hand-lamp at the same time as I ran over the fog-signals, and I put my break on immediately. Nothing in my train was thrown off the rails. The collision occurred about 2.57.

Henry Lincoln, fireman of the 2.50 p.m. Great Northern passenger train from Moorgate Street, states :—We started from Farringdon Street with all right signals, which I saw myself. I did not hear or see anything more until the three fog-signals went off just outside Granville distant-signal. Our train was then running at five miles per hour. The steam had been shut off from the mouth of the tunnel. I could not see the Granville distant-signal for the steam in the tunnel, which was so dense. I heard a shout after we struck the goods train, but did not see any red light. The distant-signal was by the side of our engine when we stopped. I do not think the waggons had been pushed up at all, or if they were it was very little. The distant-signal was burning all right at danger when I got down from the engine. I did not see the light of the break-van before the collision, but I saw it burning afterwards.

Henry Pringle, front guard of the Great Northern passenger train due to leave Moorgate Street at 2.50 p.m., states :—My train consisted of eight carriages and two break-carriages. We left Moorgate

Street at 2.50 p.m. and Farringdon Street at 2.56 p.m., and went on all right until we got into the tunnel. I was looking out from the top of the break-van, but could not see anything of the signals because of the steam in the tunnel. The collision took place within two or three minutes after entering the tunnel. The train came to a stand before it came to the distant-signal, after the collision had occurred. I heard three fog-signals, and attempted to put the break on, when I was knocked off my platform. My hand-lamp was knocked out. I lit my lamp, and got out of the break-van and went back to the tail end of the train, my mate having gone back to Farringdon Street. No passenger complained to me of being injured. The trains were coupled up, and went on together to King's Cross. I only looked out from the roof, and not from the window. I rode in the break-carriage next the engine, and there was another guard in the break-carriage at the rear of the train. There was no warning whistle from the driver before the collision took place, at 2.57 p.m.

Alfred Manning, signalman at Granville box, Metropolitan Railway, widened lines, nearly two years a signalman, states :—The Great Northern goods train in question was received "train on line" from Farringdon Street at about 2.53 p.m., and reached my box at about 2.55 p.m. I think this goods train passed my distant-signal at danger, but as it approached my box I lowered the home-signal. I do not think the goods train came to a stand. I received train on line for the Great Northern passenger train from Farringdon Street at about 2.59 p.m. I had given line clear for the goods train to Farringdon Street immediately the goods train had passed thinking all was right. Before giving line clear I thought the whole of the goods train had passed my box. I did not see the tail light, because of the steam in the tunnel. I saw what I believed to have been the break-van of the goods train, but which I now suppose was a box goods waggon, and gave "line clear" to Farringdon Street. An up Midland train had stopped under my signal-box just previously, because the driver could not see the signals in consequence of the tunnel being so dense with steam, the signal being at "caution" at the time. I saw the guard of the goods train about two minutes after the first portion of it had passed. The guard came and told me that they had broken away. I said, "Where is your train?" He said, "Just inside the distant signal." I said, "Where is your mate?" He said, "Gone back to protect the train." I told Farringdon Street the goods train had broken away, and Farringdon Street wired back that the passenger train had left. I have been a signalman at Granville box since August 1877. The window of my signal-box was open when the goods train passed, and I was at the window when the engine of that train passed. I could not stay at the window on account of the steam. I was obliged to shut the window from the steam blowing in. I think there must have been some mistake about the time of receiving train on line from Farringdon Street. I heard the detonating signals go off. I could not see at all, on account of the steam, without shutting the window of my signal-box.

From the preceding statements it appears that on the day in question a Great Northern down train of 16 empty waggons, with two break-vans at the tail of the train, left Farringdon Street station at 2.54 p.m. for King's Cross station, and as the driver of the train approached the Granville Place signal-box he slackened speed on finding the down distant-signal at danger, but he did not come to an actual standstill as the down home-signal was taken off before he reached it, and he then proceeded on to King's Cross and stopped at the station signal, which was on at danger against him, and he was not aware that he had lost a part of his train until he had done so.

The guard of the goods train, riding in the last break-van, confirmed the driver's statement as to the slackening of the speed as the train approached the Granville

Place signal-box, and he also stated that his van stopped on the King's Cross side of the down distant-signal; that after putting on his break and calling upon his mate the breaksman, who was riding in the other van, he then went forward and told the signalman in the Granville Place signal-box that his train had broken into two parts. Before starting to go forward, he told the breaksman to go back with fog-signals, in order to protect the rear of the goods train, and it appears that the breaksman went back about 20 yards and put down three fog-signals.

When the guard reached the Granville Place signal-box he told the signalman that his train had broken down, and that his mate had gone back, and the signalman informed him that he had had another train signalled on from Farringdon Street. It further appears that the signalman in the Granville Street signal-box received train on line from Farringdon Street for the Great Northern down goods train at 2.53 p.m., and the train reached his box at 2.55; that he thinks this train passed the down distant-signal at danger, but he lowered the down home-signal as it approached, and he does not think it came to a stand; that he received train on line from the Great Northern down passenger train about 2.59 p.m., as he had given line clear back to Farringdon Street for the goods train immediately it had passed, thinking that the whole of the goods train had passed his box and that all was right; he admits that he did not see the tail light on the break-van because of the steam in the tunnel, but he saw what he then believed to have been the break-van of the goods train, but which he now supposes was a box goods waggon, and then he gave line clear to Farringdon Street for the down passenger train.

The Granville Place down distant-signal can be seen when the tunnel is clear of steam for a distance of about 260 yards, shortly after a down train has entered the tunnel, but on this occasion all the evidence goes to prove that the tunnel was very full of steam, and the driver of the passenger train stated that he did not, on account of the steam, see this distant-signal until the collision had taken place, when he was preparing to stop.

There is a slight discrepancy in the evidence as to the position of the rear break-van of the goods train, whether when it stopped it stood a few yards outside or inside of the down distant-signal, but it is not material; and there is a greater contrast between the distance (210 yards) walked forward by the guard of the goods train to the Granville Place signal-box, and the distance (20 yards) walked back by the breaksman towards Farringdon Street, for the purpose of putting down fog-signals in order to protect the rear of his train; but in one case the guard had only to walk or run forward and get further away from the train while in the other the breaksman had to go back to get nearer to an approaching train which he could hear and not see, and also to put down three fog-signals, which appears to have been done, and the collision seems to have occurred very shortly after the men got out of the break-van when it had stopped.

I do not therefore see any reason for blaming any of the company's servants who were with the two trains, or the signalman in the Granville Place signal-box.

The Granville Place signal-box is sufficiently elevated to enable the signalman to look over the tops of the carriage on the down line so as to see the tops of the carriages on the up line, but he cannot see the tail lights on the break-vans at the rear of the trains, even when there is no steam to interfere with the sight, without going to the window of the box.

I know of no means of absolutely preventing the recurrence of a similar mishap, except by not permitting two down trains being on the rising incline between Farringdon Street and King's Cross stations at the same time, but that would undoubtedly limit the amount of traffic which could be worked. It is possible that by glazing the lower part of the front of the Granville Place signal-box down to the floor, and by using side and tail lights for the lamps placed on the break-vans at the rear of the trains, the signalman may be enabled to notice whether the last vehicle of every train had passed his box, even when the steam issuing from the mouth of the tunnel is very dense and thick.

The original cause of the collision was due to the fracture of the coupling between two waggons, by which the last six waggons and the two break-vans became detached from the front part of the train. It was probably caused by the putting on of the steam in order to go ahead when the train had almost come to a standstill when approaching the Granville Place down home-signal.

The fracture occurred at a very defective weld in one end of the coupling, the diameter of the coupling-iron being about $1\frac{1}{4}$ inch. I do not think it probable that

the defect could have been discovered if the coupling had been examined before the fracture took place.

I have, &c.

W. YOLLAND, *Colonel*.

The Secretary,
(Railway Department,)
Board of Trade.

Printed copies of the above report were sent to the Company on the 19th November.

METROPOLITAN AND ST. JOHN'S WOOD RAILWAY.

Board of Trade, (Railway Department,)
13, Downing Street, Whitehall, London, S.W.,

8th November 1878.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 28th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred between two passenger trains on the 25th ultimo, at the St. John's Wood Road Station of the Metropolitan and St. John's Wood Railway.

Five persons are returned as having been slightly injured on this occasion.

The leading buffer castings of the two engines which came into collision with each other were broken, but no other damage was done to the vehicles in either train, and no vehicle was thrown off the rails.

The Metropolitan and St. John's Wood Railway is a single line, 1 mile 76·16 chains in length, with a loop or passing place at St. John's Wood Road Station, situated at the foot of steep inclines on each side of 1 in 100 from the south, and 1 in 60 from the north.

This station is provided with up and down distant and starting signals, and the facing points at the ends of the single lines at the north and south ends of the station are respectively interlocked with the up and down distant-signals.

By this arrangement the facing points must be set right for up and down trains to enter the station on their proper lines before these up and down distant-signals can be taken off for trains to pass, and the taking off of those distant-signals locks those facing in their proper positions. When the distant-signals are replaced at danger the facing points are unlocked, and can then be shifted, in accordance with the usual practice.

The up and down platforms are nearly 300 feet in length, and the block telegraph signal-box is situated at the south end of the down platform. The down distant-signal is 506 yards south of the signal-box.

The traffic is worked on the absolute block system, in addition to a travelling porter who must accompany each train on the length over which he has to work.

In December 1876, the General Manager of the Company (Mr. Fenton) issued the following instruction for the guidance of the signalmen at the St. John's Wood Road station, immediately after a similar collision had occurred at the down platform through an act of carelessness on the part of the signalman then on duty:—

“ METROPOLITAN RAILWAY.

NOTICE TO SIGNALMEN.

St. John's Wood Road.

“The signalmen must be specially careful not to replace the distant-signals at danger until the trains have come to a stand at the platform.

MYLES FENTON,
General Manager.

General Manager's Office,
32, Westbourne Terrace,
13th December 1876.”

The evidence is as follows:—

Hugh Sawyer, signalman since February last, and 1½ years in the Company's service, states:—I came on duty at 3 p.m. on the 25th October. Up and down trains were due at the St. John's Wood Road station at 10.36 p.m. on that night. The up trains mostly

arrive here after the down trains; both are signalled to me, the up trains from the Swiss Cottage, and the down trains from Baker Street. On this night, the down trains were first signalled to me, but the up train arrived first, at 10.36. I had entered 10.33 as

the time of its arrival, but that was by a mistake, and the down train arrived at 10.37, but I had entered it as having arrived at 10.36, also by a mistake, as I was flurried by the collision. I had taken off the down distant-signal, moved by lever No. 8, the normal position of the points being right for a down train to run into the station; and I had also taken off the up distant-signal, the points lying right for a train to reach the up platform, so that both trains might reach and stop at the station at the same time. The up train, as I have stated, arrived first, but I was under the impression that it was the down train which had first arrived. I did not look out of the signal-box to see, but I shifted the points at the south end of the loop line at the station as soon as I thought the down train had arrived, in order to set the points right for the up train to leave the station on its way to Baker Street, and I did not find out my mistake until just as the collision was about to take place. The up train had stopped at the up platform before it was run into by the down train, which had been diverted to the up platform by my shifting of the points at the south end of the loop line.

Wm. Lucas, engine-driver one year, and seven years previously a fireman, in the service of the

Metropolitan Railway Company, states:—I was the driver of the 10.32 p.m. down passenger train from Baker Street to the Swiss Cottage. It consisted of a tank engine and six carriages, with two guards, one at each end of the train. The train was fitted with Smith's vacuum brake on the engine and on all carriages. We left Baker Street at about the proper time. As we approached the St. John's Wood Road station I found the distant-signal stood at caution for us to run into the station, and I had passed the facing points of the cross-over road before I became aware that anything was wrong. I was made aware of it by the swerving of the engine to the right. I immediately applied the vacuum break, reversed the engine, and applied the steam, and let down sand on the rails. I was travelling at the usual rate of 12 or 14 miles an hour when entering the station, immediately before I applied the vacuum break, and the speed had been reduced to nearly three or four miles an hour when the collision took place. No vehicle in my train was thrown off the rails. The leading buffer castings of my engine were both broken, but there was no other damage to my train; and the buffer castings of the up train engine were also broken. We did not throw any vehicle of the up train off the rails.

From the preceding statements and from observation on the ground, it appears that of the two passenger trains due at St. John's Wood Road station at 10.36 p.m. on the night of the 25th October, the signalman first received a signal from Baker Street for the down train, but the up train from the Swiss Cottage arrived at the station before the down train, and owing to the carelessness of the signalman on duty in not noticing which train first arrived at the station, and in direct opposition to Mr. Fenton's instruction of December 1876, he replaced the down distant-signal at danger before the train arrived, and thus took off the lock which held the facing points at the south end of the station right for a down train to run in alongside of the down platform; and then he shifted these points, and set them open for the down train to run across to the up platform at which the up train was then standing.

The down train on this occasion consisted of a tank engine and six carriages, with two guards. The whole train was fitted throughout with Smith's vacuum break, under the control of the engine-driver, and the latter did not perceive that anything was wrong until the engine began to swerve to the right, in order to cross to the south end of the up platform. The facing-points of this cross-over road are only distant about 69 yards from the spot where the collision between the two trains occurred, and 48 yards south of the centre of the signal-box.

The train is stated to have been entering the station at the usual rate of 12 or 14 miles an hour, and the driver appears to have acted very promptly in applying the breaks, reversing his engine, and in reducing the speed to three or four miles an hour when the collision took place.

As already stated, the collision was entirely due to the carelessness of the signalman on duty (Sawyer), but it appears that he has been a signalman only since last February. He also seems to have made wrong entries in his train record book. If his misconduct on this occasion be overlooked, I trust it will be a lesson to him to be more careful in future.

I have had occasion to notice before, on other parts of the Metropolitan system of railways, that, like the St. John's Wood Road Station, trains standing at the platforms are only protected by distant-signals in each direction; and to observe that the absence of home-signals placed outside of fouling points, coupled with the very general practice of running past distant-signals standing at "danger," withdraws the only precaution that can serve to protect the rear of trains, in the event of any mistake being made by the signalmen in working the block system; or to prevent him, as in this instance and in that of December 1876, from suddenly shifting the facing points and diverting the coming train to the wrong road, without any warning whatever to the driver of the train, and thus producing a collision.

I am quite aware that if Mr. Fenton's instructions of December 1876, to the signalmen at St. John's Wood Road Station had been obeyed, no collision would have occurred; but immediately the driver of the down passenger train had passed the down distant-signal, 500 yards from the station, he had nothing in the shape of a signal ahead to tell him that the points of the cross-over road were still in their proper position for him to run on the down line into the station. The introduction of

home-signals just outside the station platforms, and in this instance contiguous to the facing points of the cross-over road, which they should lock in their proper position, would serve as a guide for drivers approaching stations through tunnels when the view will frequently be very limited; and although this collision has fortunately been a slight one, I think it right that the subject of supplying home-signals to cover all station platforms should receive serious consideration from the Directors and Officers of the Metropolitan Railway Company. If the recommendation of the inspecting officer, Sir H. W. (then Captain) Tyler, who inquired into the collision which occurred at the same station in December 1876, had been attended to, it is probable that this collision would not have happened.

There is one other point to which I should draw attention, and that relates to the very narrow space between the signal-box and the edge of the platform. I do not know if this has always been so since the line was first opened for traffic in 1868, but it is in direct opposition to one of the requirements of the Board of Trade, which stipulates that the space shall not be less than six feet.

I have, &c.,

W. YOLLAND, *Colonel.*

The Secretary,
(Railway Department,)
Board of Trade.

Printed copies of the above report were sent to the Company on the 19th November 1878.

MIDLAND GREAT WESTERN RAILWAY OF IRELAND.

Railway Department, Board of Trade,

SIR, 13, Downing Street, London, S.W., 31st January 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the order of the 27th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 17th ultimo, near Blanchardstown station, on the Midland Great Western Railway of Ireland.

In this case, as the up passenger train from Sligo, Galway, &c., consisting of engine, tender, and 13 vehicles, of which the tenth and last were vans with a guard in each, due in Dublin at 12.45 p.m., was travelling at a speed of between 20 and 30 miles an hour, the tyre of the right front wheel of the tenth vehicle (the Sligo break-van) broke about a quarter of a mile west of Blanchardstown station (where the train had not to stop). The leading wheels of the van left the rails about 220 yards east of the station, and the tyre commenced to break up about 90 yards further on. The train was then gradually brought to a stand near Liffey junction, about 3 miles from the spot where the van first left the rails; no other vehicle than the van being off the line.

No passengers have complained of injury. The guard in the Sligo van was knocked about and hurt.

The Sligo van had its floor damaged, left leading spring, axle box, and axle guard broken; of the right leading wheel, the tyre of which broke into four pieces, nothing was left but the boss.

In the permanent way a number of fish-bolts were destroyed.

Description.

In the immediate locality of Blanchardstown the line (looking towards Dublin) curves to the right with a radius of about 20 chains, and falls towards Dublin on a gradient of 1 in 150. The permanent way is in very good order, having been relaid with heavy flat-bottomed steel rails in July last.

The tyre which broke was of crucible steel, manufactured by Butcher and Co., of Sheffield. It was about two years old, and was worn down from an original thickness of 2 inches to $1\frac{3}{4}$ inches. It was fastened to the rim of the wrought-iron wheel ($3\frac{1}{2}$ feet in diameter) by four bolts. It broke into four pieces, which all left the wheel within a short distance of each other, about 300 yards east of Blanchardstown station. After the tyre left the wheel, the latter gradually broke up until nothing

of it was left but its boss. Two of the tyre fractures (one of these probably the first) were through bolt holes. No signs of flaw were visible on the surfaces of fracture.

A severe frost prevailed at the time of the accident.

Evidence.

1. *James Rafferty*, 15 years driver.—I started from Athlone at right time, with the 9.10 a.m. train for Dublin, and from Mullingar the train consisted of engine, tender, and 13 vehicles, including three vans with a guard in each. There were no continuous breaks. We were 10 minutes late leaving Mullingar, and we left Maynooth, the last stop before the ticket platform at Broadstone, at 12.10 p.m., two minutes late. The day was very foggy, with severe frost and snow on the ground, but no snow had recently fallen. After passing Ashtown crossing (about a mile east from Blanchardstown) I found the train pulling heavily, and on looking back I saw a vehicle towards the centre of the train swaying about, and made sure it was off the rails, though it was not very much out of line. I immediately gave the break whistle, and then kept the whistle open. I at once saw that it was not expedient to try and check the speed at the front of the train, and so kept on sufficient steam to keep the couplings just tight, and did not have the tender-break applied at all. The speed on passing Ashtown was not more than 20 miles an hour, on account of the difficulty of seeing signals owing to the fog, and I just allowed the speed to run itself out till we stopped, about 300 yards from Liffey junction, where the signals were against us. Rule 126 applies to the case in point, when a vehicle gets off the rails behind the engine. After stopping I went back, and found the Sligo van, the tenth vehicle in the train, with the right wheel gone, and the left wheel up through the floor of the van, in which it had made a large hole. I think the trailing-wheels were on the rails. My impression is that the centre front coupling of the van had given way, but the side chains had held. The guard said he was not much hurt.

2. *John Akerman*, guard 10 years.—I was in the Sligo van of the 10.30 a.m. train from Mullingar, the van being the tenth vehicle in the combined train. We last stopped before the accident at Maynooth, and

left it at right time. I was alone in the van. I first felt something go wrong with the van about a quarter of a mile west of Blanchardstown station. There was then a little jolting; this continued for some little time, until a wheel gave way on the up side of the Blanchardstown down-distant signal. I went to my break, and had just got it on when the front of the van went down, and a wheel came up through the floor; this was before we got to Ashtown. I held on to the handle of the break until the train gradually stopped near Liffey junction. I did not notice whether the driver whistled, being too much excited. My break gave way when the front of the van fell down. I was knocked about and a little hurt, and was off duty for 11 days. Neither of the centre couplings nor any of the four side chains had given way. The speed was between 25 and 30 miles when the wheel broke.

3. *Michael Dhelan*, 18 years guard.—I joined the 9.10 a.m. train at Athlone, and from Mullingar I was in the rear vehicle of the train, a break-van; the train then consisted of 13 vehicles, the Sligo van being the tenth from the front. We left Mullingar ten minutes late, and Maynooth, the last stop, two minutes late. Between the Blanchardstown down-distant signal and Ashtown up-distant signal I felt a jerk, and the train began to run rough, the speed being then between 20 and 30 miles an hour. On looking ahead I saw the Sligo van off the rails to the right-hand side, and leaning over. I put on my break, and after this I heard the driver whistle. The signals at Ashtown were off. I shouted to the passengers not to jump out, and showed a flag first one side and then the other. The train then gradually came to a stand near Liffey junction at about 12.35 p.m., the time we are due at the ticket platform. The day was very foggy and frosty. No passengers complained of being hurt. There is no communication cord, as the train does not run 20 miles without stopping.

Conclusion.

There is no particular cause to be assigned for the fracture of the steel tyre of the right leading wheel of one of the break-vans of this passenger-train, other than the brittle state of metal and the hard condition of the permanent way induced by the severe frost. The tyre broke up, and the front wheels of the van left the rails about 3 miles from the spot where the train was eventually stopped; the escape from a most serious accident was due to the judicious conduct of the driver (*James Rafferty*) who, on perceiving that a vehicle near the tail of the train was off the rails, did not, as is so frequently the case, at once attempt to stop the train, but used just sufficient steam to keep the couplings tight until the speed ran itself out, without any other vehicle in the train than the van having left the rails. It is true that *Rafferty*, in acting as he did, was only obeying the injunctions of Rule 126, describing the duty of drivers in such cases; but, nevertheless, his conduct is very praiseworthy.

The position of the guard in the Sligo van during this 3-miles ride, while the left front wheel of the van was revolving in the hole which it had made in the van floor, was most perilous.

This narrow escape from serious disaster, and the one near Donamore on the 20th ult., will, it is hoped, have the effect of pressing home upon the directors of this railway the importance of losing no unnecessary time in having the tyres of the wheels of all their rolling stock secured by one of the modes of fastening which experience has shown to be effective in preventing the tyre leaving the wheel in case of fracture.

Had this train been fitted with continuous breaks under control of the driver, it

might have been stopped without risk as soon as the van was perceived to be off the rails, and this perilous run of 3 miles would thus have been avoided.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company.

MIDLAND GREAT WESTERN RAILWAY OF IRELAND.

SIR, Board of Trade (Railway Department),
13, Downing Street, London, S.W., 31st January 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 27th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 20th ultimo near Donamore station, on the Mayo branch of the Midland Great Western Railway of Ireland.

In this case, as the 7.30 p.m. down mail train from Dublin for Ballina, consisting of engine, tender, two carriages, and a break-van, was passing Fuerty level-crossing (two miles from Roscommon and four miles from Donamore) at a speed of about 25 miles an hour, the tyre of the left driving wheel of the engine broke. The driver was able to stop the train in from 300 to 400 yards, without any further damage having been done. It was afterwards ascertained that there was a damaged left rail close to Fuerty crossing.

No personal injuries were sustained.

The damage to the train was confined to the engine, of which the tyre of the left driving wheel was broken in one place, there being a gap about $\frac{5}{8}$ of an inch in width between the surfaces of fracture. The splasher of this wheel was also damaged.

Description.

The line in the immediate neighbourhood of Fuerty crossing is single, straight, and level. The rails are flat-bottomed, about 18 years old, weighing 65 lbs. to the yard, fished at the joints, secured to cross sleepers with fang bolts and wood screws, the sleepers being at 3 feet central intervals, except at the joints, where the intervals are $2\frac{1}{2}$ feet. The damaged rail was 15 feet long, and for a length of 18 inches near the north end its top table had spread about $\frac{1}{2}$ an inch on each side, the inner surface being crushed downwards. The line was covered with snow at the time of the accident, and the temperature low. The rail was stated to have been in good order when last looked at in the afternoon before the accident.

The tyre which broke was made of Monkbridge crucible steel, $6\frac{1}{2}$ feet in diameter, $2\frac{1}{2}$ inches thick originally, worn down to $1\frac{7}{8}$ inches thick. It was fastened to the wheel by bolts passing through the wheel rim half way into the tyre. It was put on seven years since, and had run 115,043 miles. It was fractured transversely through a bolt hole, no flaw being apparent on the surfaces of fracture. The rest of the bolts were for the most part sheared; the tyre, however, did not leave the wheel, but only opened so as to leave a gap of about $\frac{5}{8}$ inch between the surfaces of fracture. The weight on the driving wheels of the engine (which was single) was $14\frac{3}{4}$ tons.

Evidence.

1. *Patrick Quinn*, driver 15 years.—I joined the 7.30 p.m. down mail train from Dublin at Athlone. We started for Ballina at 10.40 p.m., right time, with a train consisting of engine and tender, running engine first, two carriages, and a van. We last stopped at Roscommon, and left it at right time, 11.31 p.m. I had examined the wheels of the engine before leaving Athlone, and the tyres were then all sound. The night was cold, with frost and snow. When passing Fuerty crossing, at a speed of 25 or 26 miles an hour, I heard a noise like the report of a gun from the left side of the engine. I at once blew the guard's whistle, and had the tender break applied, and shut off steam. I did not reverse, but only pulled the lever into middle gear, and stopped within about 300 or

400 yards. The only thing I observed before stopping was that the left driving wheel made a noise against the splasher as it revolved, but I did not know that the tyre was broken till after I had examined the wheel, when I found the tyre broken in one place, leaving a gap of about $\frac{3}{4}$ of an inch. I then brought the train on slowly to Donamore station, but before doing so I went back to the crossing, where the guard complained that he had got a jerk. I there found a flat spot in a left-hand rail, just on the Athlone side of the crossing, whether great enough to have caused a shock sufficient to break the tyre I cannot say. I cannot say whether the rail was broken or not, but I called the gatekeeper up, and told him to caution trains until the rail was changed.

I then remained at Donamore until an engine from Castlereagh took on the train. I afterwards took my engine back to Athlone with its own steam, nothing further happening on the way.

2. *Thomas Shally*, guard 12 years.—I accompanied the 7.30 p.m. mail train from Broadstone, and from Athlone it consisted of engine and tender, third-class, composite, and break-van. There was a special guard with me in the van. We left Athlone at 10.45, five minutes late, and we left Roscommon at right time, 11.31; and as we were passing Fuerty crossing I felt a shock in the van, as if it had run over something, and the driver whistled directly after this. I at once put my break on, and the train was brought to a stand in less than a quarter of a mile. Our speed may have been about 25 miles an hour. I went back

with the driver to the crossing, and found a rail on the left side, just on the Roscommon side of the crossing, with the top of it spread, and I then thought this was sufficient to account for what I had felt. We called up the gatekeeper, and I told him about the rail, and to allow nothing over it till it had been properly examined. We then returned to the train, and found nothing wrong with the carriages, but discovered a crack in the tyre of the left driving wheel of the engine. We then proceeded slowly on to Donamore, where we got an engine from Castlereagh to take the train on. We reached Donamore 53 minutes late. There were five or six inches of snow on the ground, but this had not fallen recently. I had passed the spot with the up mail the night previously, but had noticed nothing wrong at the spot on that occasion.

Conclusion.

The fracture of the steel tyre of the left driving wheel of the engine of the mail train in question was probably due to the blow it received in running over the damaged rail at Fuerty crossing on a frosty night, when the steel would be in a brittle condition. The bulge on the inside of the rail, amounting to about $\frac{1}{2}$ an inch, and extending for about 18 inches, probably caused the left driving wheel to mount at its commencement and to drop at its termination, the blows thus received causing the fracture of the tyre. It is very fortunate that the driver so soon discovered that there was something amiss, and stopped the train so quickly, or otherwise the tyre, which was not secured by any patent fastening, would in all probability have broken up, and serious mischief have ensued.

This narrow escape from serious disaster, and the one near Blanchardstown on the 17th ultimo, will, it is hoped, have the effect of pressing home upon the directors of this railway the importance of losing no unnecessary time in having the tyres of the wheels of all their rolling stock secured to the wheels by one of the modes of fastening which experience has shown to be effective in preventing the tyre leaving the wheel in case of fracture.

As the damaged rail was close to the residence of one of the gangers of the line, it is only reasonable to suppose that its dangerously bad state must have been produced by the passage over it by one of the trains previous to the mail train, and after darkness had set in; otherwise, had its condition been seen by the ganger, and no means taken by him to guard against accident, he would have been exceedingly to blame.

The Secretary,
(Railway Department), Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General R.E.

Printed copies of the above report were sent to the Company.

MIDLAND RAILWAY.

Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 25th January 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 16th December 1878, the result of my inquiry into the causes of a collision which occurred on the 13th December at Methley junction, on the Midland Railway.

In this case, as the 11.30 p.m. up express from Leeds was approaching Methley junction, at about 12.18 a.m. on the 13th December, running between 30 and 40 miles an hour, it came into collision, during a fog, with a goods break-van attached to an engine, which was advancing slowly up to the junction in order to shunt.

The express was made up as follows: engine and tender, six waggons, break-van, in which a guard was riding, composite carriage, two waggons, break-van, composite carriage, two waggons, two composite carriages, and rear break-van, in which the second guard was riding.

Three passengers complained of being shaken, the driver, fireman, and front guard of the express, and the goods guard, who was riding in the goods break-van, were

hurt, the last named man very seriously so, and the rear guard of the express received injuries which caused his death five days after the accident.

The engine of the express left the rails, and, after running about 90 yards, was thrown on to its side over an embankment, the tender, also on its side, remaining at the top of the bank. The whole of the vehicles in this train, with the exception of the rear break-van, left the rails.

The goods break-van was completely destroyed, but the goods engine remained upon the rails.

The rolling stock was much damaged. (See return in Appendix.)

The permanent way received the following damages :—

On the Midland line the facing-points of the junction with the Lancashire and Yorkshire Railway were torn up, the outside rail of the up line was thrown out of place, and all the chairs were broken for a distance of about 40 yards, the inside rail of the up line being undisturbed, with a few chairs only broken.

The Lancashire and Yorkshire up and down lines were displaced, and the rails bent and chairs broken, from the junction facing-points up to the spot where the engine fell over the embankment, a distance of 65 yards. A signal-post was broken.

Description.

At Methley junction there is a junction between the Midland main line running to the south, on an easy curve to the west, and the Lancashire and Yorkshire line to Pontefract, running to the south-east, and also a second junction, about six chains further south, with a North-Eastern loop line.

The facing-points of both these junctions are on the Midland up line, and both are worked from Methley junction signal-box, which is a block-post.

The next preceding block-post to the north is Methley sidings signal-box, 1 mile 7 chains distant, and the next beyond is Woodlesford station, 1 mile 38 chains further north.

Methley station is 13 chains south of Methley sidings signal-box.

The line is nearly straight from Woodlesford to Methley station, between which station and the junction it is on an easy curve to the west.

The junction up distant-signal is 919 yards, and the three up home-signals are 90 yards from the signal-box, the latter being a few yards outside the junction.

The point of collision was about 25 yards north of the home-signal-posts.

The embankment on the Lancashire and Yorkshire line over which the engine fell is about 20 feet in height.

The express train was not fitted with continuous breaks, but on the engine was a steam break, working one block on each of the four-coupled wheels and the six-tender wheels. There were also hand-breaks in the front and rear break-vans.

The line is worked on the block system, with the dial needle instruments, and code of bell and dial signals in general use on the Midland system.

The following extracts from the instructions for working the block telegraph instruments have reference to this case :—

Bell Signals.

To call attention	-	-	-	-	One beat of the bell.
Be ready for passenger train	-	-	-	-	Two beats
Train on line	-	-	-	-	Four „
Shunt train for passenger train to pass	-	-	-	-	Five „
Signal given in error	-	-	-	-	Six „

Dial Signals.

Signal correctly repeated	-	-	-	One beat of the needle to right.
Passenger train approaching	-	-	-	Three beats
Fast passenger train on line	-	-	-	Two „ to left.
Line clear of train or engine	-	-	-	Two „ to right.

General Instructions.

No. 2. All signals must be acknowledged by repeating them, and no signal must be considered as understood until it has been correctly repeated to the block-post from which it was received, and in the case of dial signals, the acknowledgment given that such repetition is correct. When the “be ready” signal is not promptly acknowledged

it must be given again at short intervals. All other signals must be repeated until correctly acknowledged. The "call attention" signal must always be acknowledged immediately on receipt.

No. 19. In the event of any failure of the instruments or bells, so that the necessary signals cannot be forwarded and received, no train must be allowed to pass a block-post on that section of the line where the failure exists, without having been previously brought to a stand, and the driver and guard advised of the circumstance.

Rule for Switching out.

At block telegraph signal-posts, where electric switches are provided, signalmen must, before leaving duty, turn the switches so that trains can be telegraphed through. A switch must not under any circumstances be turned, either for the purpose of making a circuit through or of breaking it, when any of the needles of the block instruments indicate that a train or engine is in block, or is being signalled.

Evidence.

Joshua Thomas Ward, guard 11 years, states :— I was guard of the 11.30 p.m. up Scotch express from Leeds on the 12th December. We waited for the Scotch train, and left at 11.59 p.m., 29 minutes late. There were engine and tender, six waggons of fish and game, a break in which I rode, a composite, two waggons of fish and game, a break-van, a composite, two waggons of fish, two composites, and a van in which guard Mitchell rode. The only break power was on the engine and tender, and hand-breaks in the two vans. The train is not booked to stop between Leeds and Masboro. I did not notice anything unusual. It was very foggy, but the signals at Woodlesford and Methley were all right, and I could see the Methley junction distant-signal, and it was off. Speed between 30 and 40 miles an hour, the usual speed. Not half a minute after seeing the signal I was knocked down. I was sitting on my seat after putting the window up, and was going to have a drink of tea. The train stopped, after the collision, against the junction-box. I think it would not run more than 100 yards after the collision. My van was off the rails. I got out of the van window. I shouted to H. Kidd in the junction-box, "Is this Methley junction?" He said, "Yes." There was no one else in the box. I saw that the train was off the line, and told him to wire to Leeds, Normanton, Derby, &c. I then went to Altofts. I saw the driver of our train at the bottom of the signal-box steps, before I went to Altofts. He said he had some teeth knocked out. I don't remember seeing anyone else. I did not see anything as I was going to Altofts. The signalman there said he thought something was wrong, as an engine had been there with one end damaged. I told the signalman at Altofts to block the lines, and returned to Methley junction. I saw several of the passengers against a fire, which had been made of the wreckage I suppose. I inquired where my mate was, and was told he was in the cottage, and I went to see him. He could speak. He was in bed. He said, "I believe I'm done, I feel as if it had turned my inside over." He said he had been hit on the right side, or in the back. He asked me how I had come on. I went to see if I could render any assistance, and was instructed by the inspector to go to Normanton, and get home. All the vehicles were off except the rear break. I saw the tender at the top of the bank, and the engine below. Although the carriages were off the road they stood in their upright positions. The collision occurred at about 12.10 a.m. We were not making up time. The driver and fireman were perfectly sober. I spoke to them at Leeds. I don't think the signals were visible for so much as 40 yards. It had been thick all the way, but was getting worse. I hadn't seen any fogmen out all the way.

John Haynes, passed fireman, states :— I left Hunslet sidings at 11.55 p.m., on December 12, with

an engine and break. There was a guard in the break named Potter. I heard the express was a good bit late, and knew it had not gone. We were going to Methley station to fetch traffic, and stopped at the signal-box. I called to the signalman, but received no answer. The box was in darkness. I said to the guard, there is someone calling us in the sidings. The signals were all off, and we stopped because we were ordered to go no further. On hearing someone call out I drew down to the station, and saw the signalman about 50 yards from the station. I do not know his name, except George. He had a lamp in his hand, and I asked him what he was doing out of his box. He said, I have switched out, and am going to call the fog-signalmen. He said, you must go to Methley junction, and stop there till I have opened my box again. I made all haste to get to Methley junction. I said to George, "I am ordered no further." He knew his signals were off. The express ran into us near Methley junction. All the signals were off for me. I guessed it was the express that had run into us. We were a good deal knocked about by coal and fire-irons, &c., and when I could have stopped the engine I found we were a good distance towards Altofts. I went on to stop any train that might be coming on the down line. I saw the signalman. I could not see for fog what had happened. I asked the signalman what he had in block from Methley junction, and he said the express. He asked me what I was doing there, as he did not know we were coming. I told him if he had anything coming on the down line to stop it. He said he had not, and we had better go to Normanton. My break van was smashed. My engine was tender first, and the funnel end of it was damaged, the smoke-box being knocked in, and the buffers broken off. Speed at time of collision seven or eight miles an hour. I cannot say at what time exactly we passed Methley sidings. I made all the haste I could to the junction, and took perhaps two minutes in running from Methley station to Methley junction. I could not see any signals more than 80 yards off. On approaching Altofts the distant signal was off, and the home also was off when I first saw it, but I think it was put up when we had slackened speed. I knew that it was my duty to go on to the next block station when I found a signal-box switched out.

John Copley Blackburn, fireman two years, states :— I was firing for Haynes on the 12th December. I do not know what time we left the engine shed box, as I had no watch. The guard Potter told me the express was behind us, and so we made haste. He told us at Hunslet station box. We were signalled by hand lamp to go forward by the signalman and our guard. We slackened at Hunslet south to ascertain how many wagons there were. The foreman showed us a white light, which was a signal to go right away. We then went on to Methley station, and stopped

opposite the signal-box there. We saw no one in the box, but heard a man shouting, and we went forward to where the sound came from. Haynes said "Where are our waggons?" and the man replied "I have switched." Haynes said "The express is behind us, are we to shunt here?" He said, "No, you will have to go to the junction, I am going to call the fog-signalmen." He said, "Make haste, the express is behind you." We went on quickly, and were slackening speed to shunt at the junction. When near the semaphore the express came into us, and sent us a long distance ahead. I never saw the signalman at Methley junction. The signals were off for us at the junction. I noticed the signals were on at Altofts station. I saw two red lights. I didn't see the home-signal at Altofts until within 20 yards of it.

George Spears, signalman 2½ years, states :—I came on duty at Methley sidings signal-box at 6 p.m. on the 12th December, until 7 a.m. on the 13th December. My box is a block station, but is sometimes "switched out," as on Sundays. At 11.19 p.m. I got the "be ready" from Woodlesford for the up express goods, and "train on line" at 11.22. It arrived and passed at 11.25. I sent "train on line" to Methley junction at 11.25, gave "line clear" back at 11.25, and received "line clear" from Methley junction at 11.27. All these signals were correctly repeated according to rule. At 12.4 a.m. on the 13th December, as it had become very foggy, I "switched out," in order to go and call the fogmen, which it is my duty to do at night. At the time I did this the needles in my block telegraph instruments were all vertical, showing that there was no train in block or being signalled on either side. I then left my box, and did not return till 12.27. As I was on my way to call the fogmen, about seven or eight minutes later—I was near the station—I heard something coming on the up line, and heard an engine whistling and stopping at my box. I shouted to the driver, going a little way back, and he came on. When he came to me I found it was an engine and break. The driver told me he had come to get some waggons out of Methley sidings. I told him that I had switched out to go for the fogmen, and that he must go on to the junction and shunt, because the 11.30 up express was nearly due. I told him I couldn't put him into the sidings, because he would be in the block just the same, as I was switched out. He then went on, and I heard nothing of the accident till my return. I am quite certain I received no signal whatever after the express goods had passed up to the time I switched out. The erasure in my book is in consequence of my having commenced the entry of switching out with the figures "12.4," which I then struck out and inserted after the words "switched out." I made the entry before I left, and haven't altered it since. When we switch out we do not inform the stations at either side.

William Walker, signalman 3½ years, one year of which at Woodlesford, states :—On the 12th December I came on duty at 6 p.m., until 7 a.m. on the 13th December. At 11.10 I received "be ready" from Rothwell Haigh for the up express goods, and at 11.19 "train on line." It passed at 11.22. I gave "line clear" back, and sent "train on line" forward at 11.22, and received "line clear" back at 11.25. At 11.58 I got "be ready" and at 12.3 "train on line" for engine and break, which passed at 12.8. I gave "line clear" back and "train on line" forward at 12.8, and received "line clear" at 12.11. We always send on the "be ready" at the time we receive "train on line;" this is according to rule. I must therefore have sent "be ready" for this engine and break to Methley sidings at 12.3. I am certain that it was exactly 12.3, and not half a minute later, although we don't book half minutes. I received the shunt-signal for the engine and break from Rothwell Haigh at about 12.5. I don't know exactly where the engine and break were at the time, but I thought from the sound they were at or near my

distant-signal, and I didn't think it wise to reverse my signals, as it was very foggy, and I thought it doubtful whether I could stop the engine, if it had passed my distant-signal. I therefore let it go on. After it had passed, I sent on the signal "shunt for passenger." I sent it at 12.10, and it was not repeated correctly. I sent five beats on the bell, and received only two back. I sent it again very steadily, with a pause between each beat. This signal was not repeated at all. I didn't send it again, because I felt sure that the bell was out of order. In about half a minute after, I received one beat on the bell, that is the attention signal; I answered it, and then got the "line clear" signal at 12.11, two beats on the needle, to "line clear." The needle then became vertical. I answered this signal distinctly, by repeating the two beats to "line clear." I received the proper acknowledgment that I had repeated this signal correctly. I then gave, at 12.11, the "be ready," for the up express passenger train, that is, two beats on the bell, and then three beats on the needle to line clear. This was answered correctly, and I gave the acknowledgment-signal to show that the answer was correct. After this, the signalmen in advance pegged over to "line clear." When I saw that it was firmly and correctly pegged over, I lowered my signals for the express. It passed my post at nearly 12.13, but I booked it as 12.12, because I always book back for the fractions of minutes. I sent the "train on line" signal, four on the bell, and two on the needle to line blocked, at the same time, 12.12, which was repeated correctly. I had received the "be ready" for it at 12.8, and "train on line" at 12.9, and it passed at 12.12. The whole of the signals both to and from my box were repeated correctly, and acknowledgment sent, with the exception of the shunt-signal at 12.10. I did not pass on the shunt-signal until 12.10, two minutes after the engine had passed, although I had received it at 12.5, because, knowing that there was stuff to come out of Methley sidings, I at first took it for granted that it would shunt there, and as it was running tender first I knew it was going to return. I sent the shunt because I wanted the signalman to get it out of the way quickly, the passenger train being due, and I had it on line. I didn't send on the "be ready" for the express at 12.9, when I had received it on line, because I had not yet got back "line clear" for the engine and break. I know that it is my duty to send on the shunt-signal, if I am unable to shunt a train at my post for which I have received the shunt-signal, but it is not usually done until we get "train on line" for the following train, because it is always possible that the "be ready" may be withdrawn. The hours in my box are 13 by night and 11 by day. I cannot account in any way for the mistake in the signals. If I had had the least idea that the signals had not been received, and acknowledged properly, I would have kept my signals against the express, and instructed the driver verbally to proceed cautiously.

Henry Kidd, signalman 13½ years, and 7½ years at Methley junction, states :—I came on duty at Methley junction on the 12th December at 6.40 p.m., until 7 a.m. on 13th December. I received the following signals for the express goods: the "be ready" at 11.23, and "train on line" at 11.26. It passed at 11.28, and was signalled forward as usual. I next received, at 12.7, the "be ready" for goods, and got it "on line" at 12.9. I repeated these signals in the usual way, and received the correct acknowledgment for the needle signals. The next signal I got was the "attention" signal—one ring on the bell. This was at 12.12. I repeated it. I then received five beats on the bell, signifying "shunt train for passenger train to pass," and I repeated them. I then received six beats on the bell, which signifies "signal given in error." I repeated the six beats, and unpegged my needle, which had been pegged to "line blocked" at 12.9 for the goods. I took this as a cancelling of all

the signals for the goods train, and thought that the five beats which I had acknowledged had been intended for six, and that the second six was merely a repetition of this signal; I thought, in fact, that the shunt signal, which I had thought I had received, had not actually been sent at all. The signal of six beats—"signal given in error"—is always considered to refer not merely to the one actually preceding signal, but to the whole of the signals for the train in question. I received at the same time, 12.12, the "be ready" for express passenger train, and "train on line" at 12.15. I cannot explain the discrepancy between this time, 12.15, and the time which the signalman at Woodlesford has booked it, 12.12. My clock is a minute fast, and I always book back for fractions of minutes. I had sent on the "be ready" for the goods when I received it at 12.9, and my signals were off for it. After receiving the six beats I put the signals back to danger, and withdrew my "be ready" from the station in advance. I took off my signals for the express at 12.12, not knowing anything about the engine and break being on the line in block. At about 12.18 I could hear the express approaching, and could hear she was inside my distant-signal. I then put my distant on, and sent on the "train on line." Very soon I heard a crash just near my home signals. I couldn't see so far on account of the fog. I thought at first the express had run off the rails at the facing points, as I had neither heard nor seen anything of the engine and break. After I found out that the accident had occurred, I withdrew the "be ready" for a down train, which I had received at 12.15, so that the lines were blocked in every direction. I am certain that I answered correctly at 12.12 with the five beats for shunt, and the six for signal given in error. I sent no attention signal half a minute later, nor did I give the "line clear" signal—two beats on the needle to line clear—at 12.12 (12.11 Woodlesford time), nor did I give any acknowledgment that this signal had been correctly repeated, for I never did receive or repeat it. I neither gave nor received any signal whatever back, after answering the "signal in error" signal, until taking the "be ready" for the passenger express. I have thought much over the matter, and I cannot account in any way for the mistake in the signals which must have occurred.

The driver and fireman of the express were too much hurt to attend at my first inquiry; and their evidence, as below, was taken on a subsequent occasion.

Edward Smith, driver 14 years, states:—On the 12th of December I left Leeds at 11.58 p.m. with the 11.30 p.m. up Scotch express, 28 minutes late. The train consisted of engine and tender and 17 vehicles, including three break-vans and 10 waggons. My engine is fitted with a steam-break, which has one block on each of the four coupled wheels, and one block on each of the six tender wheels. We were delayed by signals at Rothwell Haigh. I found the signals off at Woodlesford and Methley sidings, and the Methley junction up distant signal was also off for me. It was very foggy, and I could see the signals only about 50 yards off. On nearing Methley junction I saw the red lights of a train in front. I was then about 50 or 60 yards from them. I applied the steam-break at once, and shut off steam. We were running 30 or 40 miles an hour at the time. There was no time to whistle for the guards' breaks. I don't think I reduced speed very much before we struck the train in front. I thought this train was at a stand when I first saw it. We left the rails, and ran for, I daresay, 100 yards before my engine pitched over the embank-

Robert Walton Clegg, district traffic inspector, states:—On the morning of Sunday, the 15th December, when going to Methley junction with the break down gangs, we were pulled up at Woodlesford by signal, and the signalman told us that the block bell instrument had failed, and we were to proceed to Methley junction with caution. At the same time he told us that Methley sidings had switched out, and that from that time the bell had failed. We went on to Methley junction, and when I got there I tested the bell to Woodlesford, and found that it did not act properly. I gave nine beats, for test signal, three or four times, and it was not once correctly repeated. Neither Kidd nor Walker were on duty at the time. I telegraphed for the line-man, and he came during the forenoon. He put things right. I inquired and found that up to the time of switching the bells had been ringing right.

James Rathbone, telegraph inspector, states:—I went to Woodlesford on Sunday morning, 15th inst., and found the bell there missing its strokes. I asked the signalman how long it had been doing so, and he said it was all right until Methley sidings switched. I endeavoured to rectify it by putting the mechanical part of the bell right, but I found it missed again, and I altered what I had done. I then rang the test signal from nine beats downwards to one beat, and all the beats were correctly repeated. When I had left the box the signalman called me back, and said he had received two beats for three beats. I then went to the junction and took the batteries out, to see if they were frozen, and found they were not, although the water was very cold. I told the signalman if the door where the batteries were was not kept shut they would be frozen. I afterwards tried the bells on two occasions, and got correct replies from Woodlesford, and I have heard no complaint since. I cannot say what was the cause of the failure. It is quite possible that, when a post is switched out, a bit of dirt or other matter may cause a contact, and prevent the bells from working correctly. A switch may become dirty from damp, or from some other cause, so as to make a partial failure. It is quite possible that the action of putting on a switch may disarrange the connections, in such a way as to prevent the bells from working correctly.

ment, and I went down with it, and also my mate. The engine turned over on its side. It was on the left-hand side of the Lancashire and Yorkshire line. I was shaken, and my left arm was badly burnt. The guard Ward went to protect the train.

William Palmer, fireman, states:—On the 12th of December I was fireman to Edward Smith. The signals after leaving Leeds were all right up to Rothwell Haigh, where the distant-signal was on. We proceeded cautiously to the home-signal, and it was taken off. The signals at Woodlesford and Methley were off, and also the distant-signal at Methley junction. When running at about 40 miles an hour, between the distant and the home-signal, I saw the tail lights of a train. I called to the driver to stop and found him shutting off steam. There was no time to whistle. I stuck to the engine, and went over the bank. I was burnt on the face and left arm, and a good deal shaken. The tail lights were about 50 or 60 yards off when I saw them.

Conclusion.

From the foregoing evidence it appears that just after midnight, between the 12th and 13th of December, the signalman at Methley sidings signal-box, finding that a fog had come on, and was increasing, was obliged to leave his signal-box to summon the fog-signalmen, and that before doing so he, in accordance with his instructions,

“switched out;” that is, threw his electrical instruments out of circuit, and thus placed the signalmen at Woodlesford and Methley junction, the adjacent block telegraph posts in either direction, in direct communication with each other.

This man states that at the time he “switched out,” 12.4 a.m. on the 13th December, as duly recorded in his book, the needles in his block instruments were vertical, showing that there was no train in block in either direction, and that none were signalled, but the signalman at Woodlesford states that he sent forward the “be ready” signal for an engine and break at 12.3 a.m., and this signal, not recorded at all at Methley sidings, is entered in the Methley junction book as being received at 12.7 (12.6 right time). This would seem to imply that the signal was sent before Methley sidings was “switched out,” and was passed on to Methley junction at 12.6, but as it does not affect the cause of the accident one way or another, it is hardly material to consider whether or not the Methley sidings signalman acted in strict accordance with the rule for switching out.

The engine and break, which were destined for Methley sidings, passed Woodlesford at 12.8, and the signalman at this box, who had at 12.5 received a signal from Rothwell Haigh to shunt this train, presumably because the express was overdue, though not yet signalled, did not shunt it, but allowed it to pass on to Methley sidings. On arriving there the signal-box was found to be shut up, and on hearing from the signalman that he was “switched out,” and that he could not therefore shunt him into the sidings, the driver made all haste on to Methley junction, in order to shunt there out of the way of the express.

When running at about seven or eight miles an hour, and preparing to stop, he was overtaken by the express, running at a high rate of speed, at a point about 30 yards outside the junction with the Lancashire and Yorkshire line. The goods break was so completely destroyed that it is marvellous how the guard who was riding in it escaped with his life, and the engine was driven ahead with comparatively little damage. The engine of the express left the rails, and, after breaking up the facing points of the junction, followed the up Lancashire and Yorkshire line for about 90 yards, and then fell on its side over an embankment about 20 feet high, the tender remaining on its side at the top of the bank. The leading vehicle, a fish waggon, was found on its side on the Midland down line, the nine following vehicles upright on the Lancashire and Yorkshire line, the front one being 30 or 40 yards beyond the engine, and the seven rear vehicles on the Midland up line, all off the rails except the rear break-van, which stopped short of the facing points, and remained on the rails.

Allowing for the difference in time between the two clocks, the records in the two signal-boxes of the signals which passed between Woodlesford and Methley junction, after Methley sidings had been switched out, agree up to the point where the signalman at Woodlesford sent “train on line” for the engine and break at 12.8, but there is a great discrepancy in the evidence as to the signals which followed.

The signalman at Woodlesford states that he sent the “shunt signal,” five beats, at 12.10, for the engine and break; that it was answered incorrectly by two beats only; that he sent it again, when it was not answered at all; that half a minute later he received the attention signal, one beat, and then, at 12.11, the “line clear” signal; that he answered this signal correctly and received the usual acknowledgment; that he immediately gave, at 12.11, the “be ready” for the express, which signal was properly answered and acknowledged, and that not till then did he lower his signals for the express. He also states that the express passed at 12.12, when he sent the “train on line” signal, which was correctly answered.

The signalman at Methley junction, on the other hand, states that after receiving the signal “train on line” at 12.8 (right time), for the engine and break, he got, at 12.11, the shunt signal, five beats, which he repeated, and then, immediately after, six beats, which signifies “signal given in error,” and which, according to the practice, he considered as cancelling all the signals with regard to the train in question.

Therefore, having correctly answered these two signals, upon receiving, also at 12.11, the “be ready” for the express, he took off his signals, which he had put to danger upon receiving the signal for “signal given in error.”

He denies altogether that after this he gave the “line clear” signal at 12.11, or any signal at all, except the proper repetition of the “be ready” and “train on line” for the express.

It is quite impossible to reconcile these two widely differing statements, and, although it is perfectly clear that this unfortunately fatal accident was due to a misunderstanding between the two signalmen at Woodlesford and Methley junction, it is difficult to determine which of them is giving the true account of the signals which passed between them.

It is, however, certain that the signalman at Woodlesford, if he had strictly obeyed the rules laid down for his guidance, might have prevented this accident, in spite of the possible after default of the signalman at Methley junction. He admits that when his second shunt signal to Methley junction was unanswered, he did not repeat it again; whereas, according to the rules, he ought to have continued to repeat it until it was correctly acknowledged. His excuse that he did not do so because he was "sure that the bell was out of order" is of no value, for if this were the case, he should, according to the rule, have brought the express to a stand, and allowed it to proceed with a caution.

In my opinion he erred also in not shunting the engine and break at Woodlesford. He says that when he received the shunt signal from Rothwell Haigh, at 12.5, he thought by the sound that this train was past his distant-signal, and that as it was foggy, he didn't think he could stop it. As, however, it appears that it did not pass his box until 12.8, it was probably at 12.5 further off than he thought, and considering that the express was then long overdue, he ought certainly to have made the attempt to comply with the shunt signal which he had received.

It is difficult to account for the manner in which the block instruments acted after Methley siding had been "switched out," but it is quite possible that this operation may have caused them to work irregularly, owing to some dirt causing partial contact; still, had the rules been properly attended to, the irregularity ought to have been the cause only of some delay and inconvenience, and not of any actual danger.

It seems that the statement of the signalman at Methley junction, to the effect that the "signal given in error" is taken as cancelling all signals referring to the train in question, is correct, but this is not so clearly laid down in the instructions as might be wished, for in this very case it might have been of vital importance that it should be perfectly clear whether the signal cancelled was merely the immediately preceding signal, the shunt-signal, or the whole of the signals relating to the engine and break.

It is most desirable that a rule should be inserted that, when signalmen "switch out," the men in the adjacent signal boxes, which are thus put into direct communication, should be informed of the fact. If such a rule had been in force it is most improbable that the Woodlesford signalman would have allowed the engine and break to pass on to Methley junction, believing, as he says he did, that they were destined for Methley sidings, where he would have known that they could not have been shunted.

The distance available in which to stop the express, after the driver became aware of the danger, was so short, that the collision could not have been averted, even if the train had been fitted throughout with a continuous break; but no doubt by the help of such a break, under the control of the driver, the effects of the collision would have been considerably mitigated.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major R.E.

APPENDIX.

MIDLAND RAILWAY.

COLLISION AT METHLEY JUNCTION, December 13, 1878.
PARTICULARS as to WEIGHTS of and DAMAGE to
ROLLING STOCK.

Passenger Engine No. 1352.

Diameter of cylinders - - - 17½ inches.
Stroke - - - 26 "
Diameter of wheels { Leading - - - 4 ft. 2 ins.
Driving and trailing 7 ft. 0 ins.

Weight of engine and tender in working order.

	Tons.	cwts.	qrs.	Tons.	cwts.	qrs.
Leading wheels - -	10	15	0			
Driving wheels - -	13	1	2			
Trailing wheels - -	11	5	3			
				35	2	1
Tender - -				32	11	1
				67	13	2

Weather-board, cab, foot-steps, hand-railing, feed pipes, and framing damaged.

Tender framing and one axle bent.
Two axle-boxes broken.
Foot-plates, tank sides, break gearing, and pipes damaged.

Goods Engine No. 669.

Diameter of cylinders - - - 16½ inches.
Stroke - - - 24 "
Diameter of wheels - - - 5 ft. 2 ins.

Weight of engine and tender in working order.

	Tons.	cwts.	qrs.	Tons.	cwts.	qrs.
Leading wheels - -	12	4	0			
Driving wheels - -	12	19	0			
Trailing wheels - -	9	13	2			
				34	16	2
Tender - -				22	0	1
				56	16	3

Smoke-box front driven in.
Buffer plank broken in centre.
Both buffers broken.
Sand-boxes broken.

RETURN of DAMAGES to ROLLING STOCK.

Glasgow and South-Western Composite, No. 51.

1 long foot-board broken.
1 draw-bar broken.
1 end of body broken.
1 side of body broken.
1 headstock broken.

Highland Fish Wagon, No. 1679.

1 headstock broken.
3 end planks broken.
4 buffer rods bent.
3 axle-boxes broken.
Break-work damaged.

Glasgow and South-Western Passenger Van, No. 86.

1 end hand rail bent.
1 side of body damaged.
Both ends of body damaged.
1 long foot-board damaged.
2 axle-boxes broken.

North British Fish Wagon, No. 12,928.

2 axle-boxes broken.
4 axle-guards bent.
1 headstock damaged.

North British Fish Truck, No. 14,468.

2 axles slightly bent.

North British Break-van, No. 145.

1 commode handle damaged.

Midland Passenger Van, No. 238.

1 end of body slightly damaged.

Midland Composite, No. 732.

1 buffer casting broken.

Midland Covered Fish Truck, No. 289.

Both ends of body completely broken in.
1 side of body completely broken in.
3 axle-boxes broken.
1 short foot-board broken.
1 headstock broken.

Highland Fish Wagon, No. 1408.

2 axles bent.
4 axle-boxes broken.
2 axle-guards broken.
1 side door plank broken.

North British Carriage Truck, No. 9.

4 side springs broken.
4 axle-guards broken.
2 middle bearers broken.
2 headstocks broken.
4 axle-boxes, &c., broken.

Caledonian Fish Van, No. 102.

Body and under-frame broken.
4 step irons broken.
4 axle-boxes broken.
1 axle bent.

North British Fish Truck, No. 32.

1 axle-box broken.
4 side springs damaged.
1 end door top rail broken.
5 side of body boards broken.
2 end door hinges broken.

Glasgow and South-Western Fish Van, No. 57.

2 buffer-rams broken.
1 headstock broken.
2 body corner posts broken.
1 body end muntin broken.
11 body end boards broken.
1 side spring broken.

Printed copies of the above report were sent to the Company.

NORTH BRITISH RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., 5th November 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the order of the 12th ultimo, the result of my inquiry into the collision which took place on the 11th ultimo, between East Grange and Bog Side Stations on the Stirling and Dunfermline branch of the North British Railway.

In this case a special up goods train from Stirling to Cowdenbeath, consisting of engine, tender, 26 waggons, and a van, came into collision with a ballast train, consisting of tender, engine, van, and 11 waggons, which had proceeded from East Grange station towards Bog Side on the wrong or up road, and was about to unload ballast at a spot 1,200 yards from East Grange station.

A platelayer riding in the van next the engine of the ballast train was killed on the spot, and the fireman of the special train was badly shaken.

In the ballast train the tank of the tender was destroyed; the break-van next the engine and two ballast waggons were damaged.

In the special goods train the smoke-box and buffer beam of the engine were knocked to pieces; the tender separated from the engine and rolled down the slope of an embankment; 10 waggons were destroyed and partly burnt, two of these waggons next the engine having contained paraffin, which was set fire to by a spark from the engine.

Description.

The line at the scene of this collision curves gently to the north-east, and in consequence of a cutting the view of the driver of the goods train as he approached the

flagman protecting the ballast train was limited to about 300 yards, and his view of the ballast train itself (in consequence of an over-bridge) did not exceed 265 yards. The line is level to within 265 yards of the point of collision, and then rises on a gradient of 1 in 100 up to and beyond it. The position of the flagman was about 335 yards from the engine of the ballast train; the total distance from the engine of the ballast train to where the driver of the mineral train first received any warning was thus about 635 yards.

The stations on this part of the line are, as a rule, provided only with distant-signals, which are not interlocked with the points. The block system is not in force.

Evidence.

1. *Duncan Cameron*, station master at East Grange 10 months, and 16 years previously at Bog Side.—I was on the platform as the ballast train came in on the down line from the ballast pit at Oakley, at about 4.23. I had no communication with any one in the train, and as soon as I had seen the engine pass the siding points I went into the station house to get my tea. Before this, I had seen the guard of the ballast train jump from the last waggon into the siding. I thought the ballast train was going to work between this and Bog Side, where it had been working for some time past, but I did not know it was going to work on the up line. It had not used the up line on any previous occasion to my knowledge. I should have prevented it working on the up line had I known it had been going to do so. It was not till after the collision that I knew it had been working on the up line. I had had no information that there was a special train coming from Stirling. The down distant-signal had been put to danger by the porter after the ballast train had arrived. We have no home-signals. There is no telegraph here. The next down train passing here was a goods train for Portobello, due at 4.45. It passed before I had heard of the collision. The distant-signal was taken off for it, as I was told by the porter after the collision. The train did not stop here. Neither I nor the porter held any communication with it. I made no attempt to stop the Portobello train, believing that the ballast train would have been away by this time, 5 o'clock, and knowing that it had a man to protect it. The rule is that "except in cases of great emergency the plate-layers must not avail themselves of the station signals, but must use their own special signals for their own purposes." Rule 213 prohibits drivers from passing from one main line to the other without informing the station master. Rule 56 is to the same effect, only more general.

2. *Thomas H. Howison*, porter at East Grange since May last; for six months previously at College station, Glasgow.—I was between the station and the weigh-house when the ballast train passed. I put up the down distant-signal to danger before the train reached the station. I then went to the weigh-house to clean my signal lamps, and being inside the house with the door shut, I neither saw nor heard the ballast train stop. I did not know the ballast train had crossed from the down to the up line till I had come back from lighting the down distant-signal lamp after the collision had happened, soon after 5, when I met the guard of the Portobello train coming back to the station to inform the station master of the collision. On no previous occasion have I known the ballast train to go on the wrong line from this station to Bog Side. When I came from the weigh-house to light my lamps, I found that the down distant-signal had been turned to clear; I did not put it again to danger as the train had passed more than ten minutes, and I did not know the train was going to work between this and Bog Side. I asked the station master about the distant-signal, and he said that he had not taken it off. I did not hear the noise of the collision, nor any whistling. No one in the ballast train said anything to me as it passed slowly. There was a surface man sitting in the office when the ballast train passed, and he remained there some little time.

3. *James Forrest*, driver 12 years.—I started from Stirling at about 4.20 p.m. with a special train of cattle and mixed goods for Cowdenbeath, having no work to do till we reached Dunfermline. On the engine with me was my fireman, Joseph McGregor. I was standing on the left side of the engine, which is a 6-coupled engine with a 6-wheeled tender, with two breaks. We had on a load of 25 waggons and a break-van. We got clear signals at Bog Side, and I was running round the curve near Middle Grange Bridge at a speed of between 26 and 30 miles an hour, when I saw a man walking towards me in the 6-feet space, at this time between the bridge and the gradient board; seeing a flag in his hand half rolled up, I shut off steam, applied my break, and told my mate to put on his, and whistled, and then the man waved his flag, still coming forward. I kept my break hard on, passed the man about the gradient post, and on coming to the bridge caught sight of the ballast train, which I was at first afraid was moving toward me. On seeing this, I reversed my engine, and put on steam, speed being about 15 miles an hour, and I then shut off steam and got down on to the step, and jumped off on the left side and rolled down the bank, but without being much hurt. My fireman jumped on the right side. The speed was not much reduced when the collision occurred. My engine was knocked off the rails into the 6-feet space, and the tender separated from the engine and went down the bank on the left. The paraffin was in small casks in the waggons next the tender. It did not catch fire till a spark from the engine fire, caused by throwing water on it, lit on some that had been spilt. The fire lasted some five or six hours. The Portobello train just stopped in time to escape the wreck of the collision, which had fouled the down road. The man who was killed was in the body of the van which was destroyed by the ballast waggon next it having mounted its frame. The up distant-signal from East Grange was at danger. I saw this as I came below the bridge, the first place from which it is well in sight.

4. *Matthew Stewart*, 12 years goods guard.—I was guard of the mixed (special) goods train from Stirling to Cowdenbeath on the 11th October last. My train left Stirling at 4.25 p.m., and it proceeded without stopping till between Bog Side and East Grange, when my attention was arrested by the driver shutting off steam. I looked out of my van first on the outside, but seeing nothing I then looked out on the 6-feet side. I saw a man on the line in the 6-feet space with a red flag in his hand, of which only a few inches were shown. He was standing, as nearly as I could judge, opposite a gradient board, immediately to the west of an over-bridge, close to the scene of the accident. Directly I saw the man I put my break hard on. This had the effect of considerably reducing the speed of my train, which consisted in all of 27 vehicles, including break van. The speed of my train when the collision occurred would, in my judgment, be reduced to 15 miles an hour. I instantly ran back to protect my train, and I took the ballast train guard along with me to Bog Side station. It is my impression that the ballast guard was standing on the spot where I first saw him with the red flag, and that he was not walking towards Bog Side station.

5. *James Robertson*, fireman about one month at the time of the collision, and cleaner at Dunfermline about 20 months.—I had left Oakley ballast pit in the morning of the 11th with a ballast train for Causewayhead. The ballast had been disposed of between Cambus and Causewayhead on the proper line of rails. We crossed at Causewayhead, returned to Oakley, and again started in the afternoon with a train, consisting of tender, engine, van, and 11 waggons of ballast, for the line between East Grange and Bog Side. We had done the same thing the two previous days, but had on each of these occasions gone to Bog Side and come back on the proper line. I heard no arrangement made as to crossing at East Grange on this trip, so as to work on the wrong line. As we approached East Grange, I saw no one but the porter putting the signal up, after which I did not see him. We stopped by order of McPherson, the foreman of the ballast train, when clear of the cross-over road, who held open the points for us to set back on to the up line. I did not hear the driver refuse to go forward when he knew we were going along the wrong line. I thought at first we were going to work close to the station. The foreman, driver, and myself then went forward, the guard going in front with a red flag. He seemed to be about 400 yards off; this

was when we started. He walked, and we went very slowly and did not gain much on him. After the train had crossed, McPherson told me to put the up distant-signal to danger, and I went and did so, but did not meddle with the down distant-signal, nor did I see anyone else touch it. I then returned to the engine. We first stopped this side of the up distant-signal for about five minutes, and then again this side for another 10 minutes, and our next stop was at the spot where the collision occurred. When we had just come to a stand I heard a whistle from the engine of the special train, and on looking forwards saw it just the other side of the bridge. The driver and I were both on the engine, and the reversing lever was over toward my side; the driver threw it forward, but did not put on steam, and the other train then ran into us. We both of us jumped off, and were not hurt. All the men were off the waggons when the collision happened, except the one who was in the van, and he was killed. The trailing wheels of our tender were thrown off the road. I had no watch on, and the times I mentioned are merely those I thought had elapsed. When we last stopped, I saw the guard the other side of the bridge, 271 sleepers from the collision; I counted them afterwards. I saw him begin to run when the engine whistled.

I was unable to take the evidence of the driver, foreman, and guard of the ballast train, as these men were in prison at Perth awaiting their trial.

Conclusion.

This collision, which resulted in the loss of the life of a company's servant and in great destruction of property, was due to the misconduct of the foreman, driver, and guard of the ballast train. The foreman and driver took upon themselves (without any apparent necessity) to cross from the down to the up line at East Grange, without the knowledge of the station master or porter there, and to proceed along the up or wrong line towards Bog Side, depositing ballast on the way, and finally stopped for this purpose on a part of the line where, in consequence of a bridge, curve, and cutting, the head of the ballast train could be seen from an approaching engine for a distance of only about 265 yards, the guard of the ballast train having been at the time only 335 yards from the front of the ballast train, and visible to the driver of the approaching goods train only for about 300 yards, and, according to the evidence, not displaying a proper danger signal until the driver of the goods train whistled to attract his notice. By Rule 60, the guard of the ballast train should have been 1,200 yards from the engine of the train, with six detonators placed on the rails, two at 400, two at 800, and two at 1,200 yards, and, besides this, should have conspicuously exhibited his hand danger-signal. Notwithstanding, therefore, the misconduct of the foreman and driver of the ballast train in using the wrong line, the collision would have been prevented had the guard of the ballast train at all acted up to the provisions of Rule 60.

Had the points and signals at East Grange station been properly interlocked and the line worked on the block system, the ballast train could not have proceeded toward Bog Side on the wrong line without the knowledge of the signalman, who would most likely have prevented such an improper proceeding; or even had he imprudently permitted it, he would have blocked the up line at Bog Side, in which case the goods train would not have been allowed to leave that station.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on the 30th November 1878.

NORTH-EASTERN RAILWAY.

Railway Department, (Board of Trade,)

SIR, 13, Downing Street, London, S.W., 29th January 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in your Minute of the 30th November, the result of my inquiry into the circumstances connected with the explosion of the boiler of the engine of a goods train, which explosion occurred on the 24th November at Blaydon, on the Newcastle and Carlisle branch of the North-Eastern Railway.

In this case, while the 5.30 a.m. goods train (consisting of engine, tender, 45 waggons, and a van) from Carlisle for the Forth goods yard, Newcastle, was standing at Blaydon station, where it had been stopped by signal, the boiler of the engine exploded.

The driver was slightly, and the fireman severely, scalded, and an engine-lighter (who was standing near the engine) was cut about the head.

The barrel of the boiler was more or less destroyed, nearly the whole of the middle top plate, together with portions of two adjoining ones, having been blown away, and fallen, it is supposed (as it has not yet been found), into the Tyne, which was within 50 yards of the line; other fragments of plates, &c. were thrown both to the right and left, as shown on diagram No. 1, the farthest piece having been picked up 280 yards to the right. The machinery of the engine was a good deal damaged, and some buildings in the neighbourhood were struck by fragments from the boiler.

The engine, No. 787, of which the boiler exploded was supplied to the North-Eastern Company by Messrs. Stephenson and Co. in June 1872, and had run, up to the time of the accident, 198,929 miles. It was a six-coupled engine, with inside cylinders 17 ins. by 24 ins. The barrel of the boiler was composed of six Lowmoor plates $\frac{7}{8}$ inch thick, three in the length and two in the circumference of the boiler. The barrel was telescopic, all the joints double rivetted, and the horizontal joints so arranged as to avoid inside landings. The dome was 22 inches in diameter. These and other details are shown on diagram No. 2.

The repairs to the engine during the $6\frac{1}{2}$ years it had been running amounted in all to 1,618*l*. The last heavy repairs had been executed between October 1877 and March 1878, when the boiler had been retubed and tested up to 220 lbs. to the square inch with lukewarm water, and with steam up to 140 lbs., the working pressure having been fixed at 135 lbs.

Evidence.

1. *John Hardy*, driver about 11 years.—I started with the 5.30 a.m. through goods train from Carlisle for Newcastle at 6.35 a.m. on the 24th November, having been detained waiting for waggons from other trains. I had on a train of 45 waggons and a van, a regular load. My engine was No. 787, a six-coupled goods engine, running engine first. I had had the engine about three years. During this time I had never known it leak. It had been last in the shops in October for some length of time, when among other repairs a fresh set of tubes had been put in. One or two of the tubes had burst before it went in for repairs. I do not know that the boiler had ever been patched. We had stopped at Haydon Bridge for water, the only time we stopped till we reached Blaydon, 59 miles from Carlisle at 9.5, where we were stopped by signal, and had remained standing five or six minutes waiting for the signal, when the explosion occurred. I was standing on the ground about five yards from and opposite to the foot-plate on the right-hand side, when, after hearing something like a crack, there was a kind of rush upon the explosion taking place. I do not know exactly what happened to me, but on coming to myself I was on my knees nearer Newcastle than where I had been standing before. The engine had not been moved forward, nor separated from the tender, nor did it leave the rails. When I had got off the foot-plate steam was blowing off from the safety valves in the dome, which it would do when the gauge showed about 135 lbs.; it would blow off

at the lock valve at about 138 lbs. The blowing off had not increased at the time of the explosion. The water was within half an inch of the top of the gauge glass, the fireman having just closed the injector about five or six minutes before the explosion: he had then followed me off the footplate to speak to an engine-lighter whom he knew. The injector had been turned on about half a mile before we stopped, when the glass was about half full. The fireman had last fired about two miles before reaching Blaydon. I was scalded about the head and neck, and was not able to make much examination of the boiler after the accident. I can give no reason for the explosion, and had never had any misgivings as to the state of the boiler.

2. *William Hewitt*, fireman $6\frac{1}{2}$ years, about $2\frac{1}{2}$ years with Hardy.—I have known engine 787 about three years. During this time I have never seen any leaks in the boiler; one or two tubes had burst before it went in for repairs in October 1877. Nothing went wrong from March 1878, when it came out, up to the time of the explosion. It was free in blowing off at the valves,—at the dome valves at about 125 lbs., and at the lock valve at about 130 lbs. Nothing unusual occurred on the morning of the 24th November on the journey from Carlisle to Blaydon. We had on a train of the ordinary magnitude. On reaching Blaydon we were stopped by signal, when the driver got off to speak to an engine-lighter, and I followed him in about two minutes. I had shut

NORTH EASTERN RAILWAY.

BOILER EXPLOSION

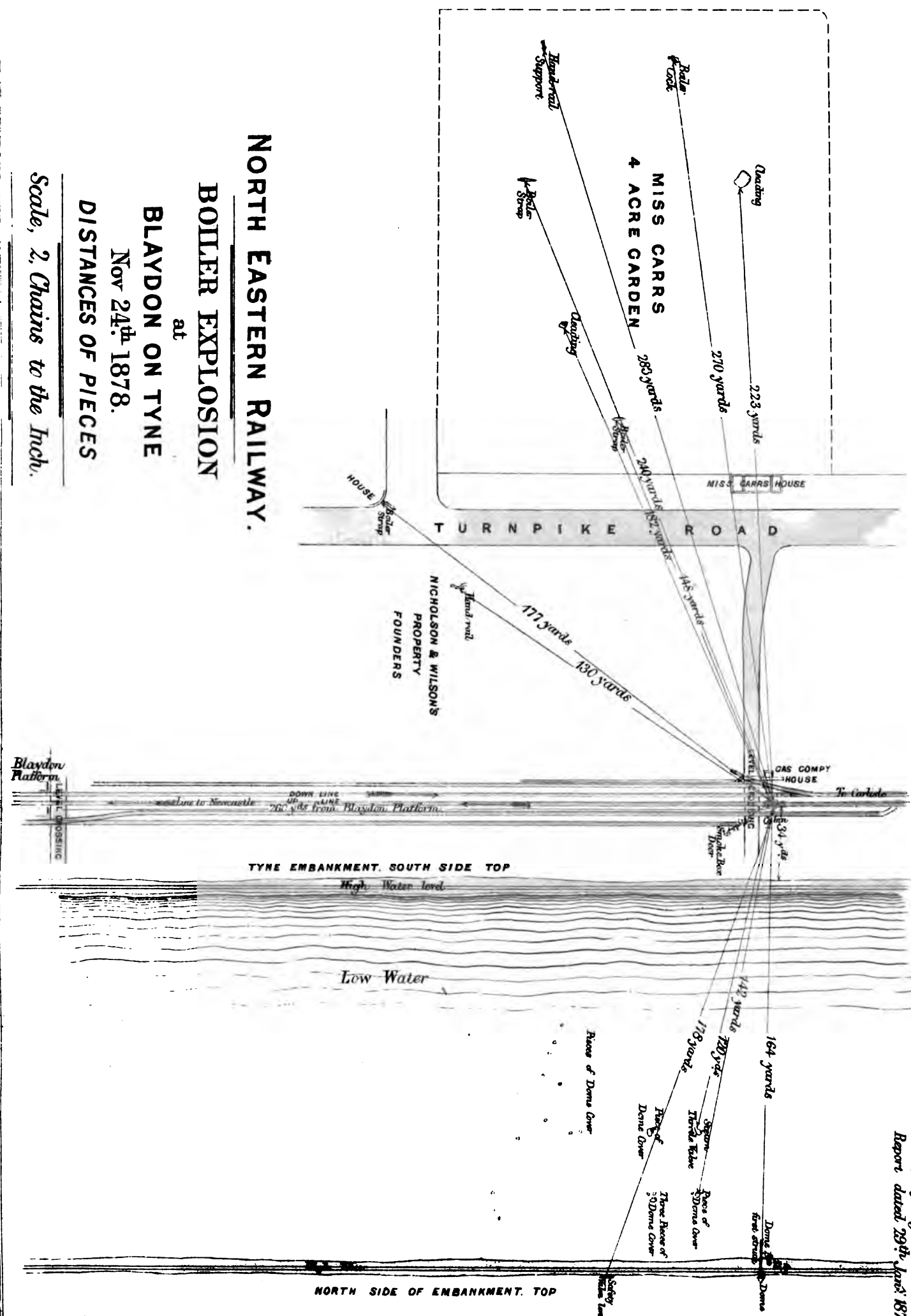
at

BLAYDON ON TYNE

Nov 24th 1878.

DISTANCES OF PIECES

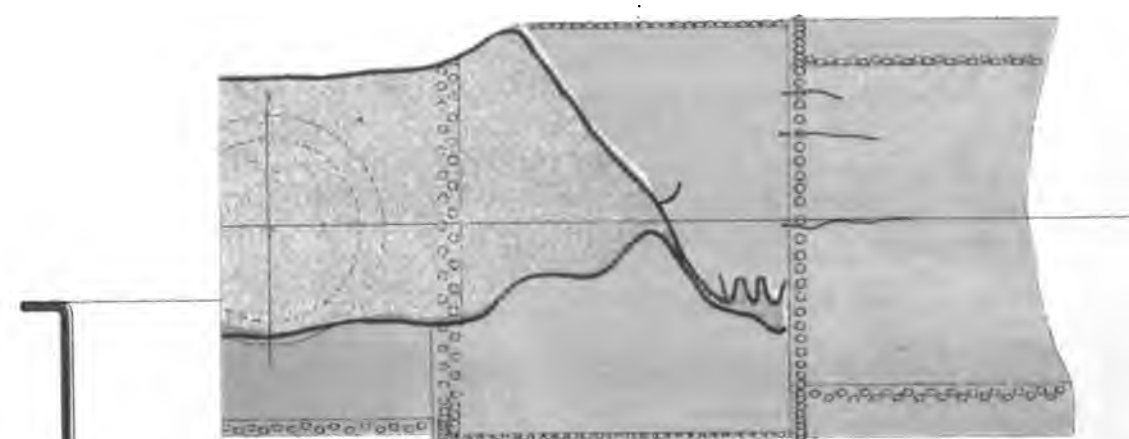
Scale, 2, Chairs to the Inch.



*To accompany Major General Hutchinsons
Report dated 29th Jan^y 1879.*

To accompany Major General Hutchinsons
Report dated 29th Jan^y. 1879.

Right Side



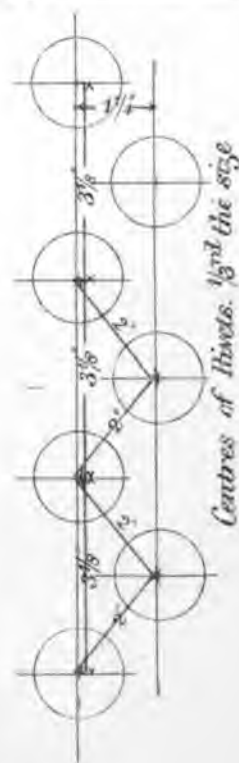
Plan on Top



Section of Dome



Plan on Top



Centres of Rivets. $\frac{1}{3}$ rd the size

the injector just as we stopped, having put it on about a quarter of a mile back : the glass was about half full when I put it on and nearly full when I shut off. The pressure gauge was between 130 and 135 lbs. when I got off, and steam blowing off both at the dome valves and lock valves. I had been standing about two minutes nearly opposite the front of the engine, and on the right side of it, when, without my hearing any warning, except my mate saying "What's that?" I was carried 15 or 16 yards towards Newcastle, thrown down, and scalded. I was insensible for a short time, and was then able to get up. I was scalded on the leg and arm, and was away from work for three weeks. I heard no report when the explosion took place.

3. *Thomas Johnson*, boiler smith.—About February 1878 the boiler of engine 787 was retubed. I was never inside the barrel of the boiler myself, but a boiler smith was, who did not report anything as being wrong. I examined the outside of the barrel and saw no signs of leakage. After the repairs were

completed the boiler was tested up to 220 lbs. with lukewarm water, and with steam up to 140 lbs., the working pressure being fixed at 135 lbs. No leakage was observed after these tests. My own opinion is that the mischief commenced at the dome, though there are no marks of pitting or corrosion where the rent took place. The dome plates are $\frac{1}{8}$ of an inch thick.

4. *George Waters*, boiler smith 18 years in the Gateshead shops.—I remember taking the tubes out of boiler 787 about the end of 1877, and I afterwards examined the inside of the barrel of the boiler. I gave it a thorough inspection, and saw nothing like a crack on any part of any of the plates, nor any pitting. The longitudinal joints of the barrel were outside joints, double rivetted. It was a telescope boiler. I found no signs of leakage anywhere. I saw the boiler pressed to 140 lbs. steam pressure before it had the hydraulic test, and there was no leak perceptible afterwards. I think the pitch of the rivets was less than usual.

Conclusion.

After a careful inspection of the exploded boiler, and from a consideration of the above evidence, I have formed the opinion that the explosion commenced at a horizontal flaw near the top of the lower middle plate on the right-hand side of the boiler. This flaw extended nearly the whole breadth of the plate, varying in depth, but in parts leaving a mere skin of sound metal. Towards the front of the plate the flaw ran obliquely upwards, towards the joint between it and the top plate, and at this point there were slight signs of leakage. The fracture thus commenced ran through the vertical joint next the front plates, extending as far as the left side of the dome, then across the upper middle plate through the vertical joint between this plate and the rear plate, across the rear plate, and beyond its centre; then downwards obliquely through this plate and the corner of the lower rear plate to the flaw in the lower middle plate. It is this large piece of the boiler, measuring about five feet by four feet, which has not yet been found, but which is supposed to be lying at the bottom of the Tyne, which flows to the left of the line (looking towards Newcastle) and about 50 yards from it. The dome which had been attached to this piece was separated from it, the separation having taken place partly through the rivet holes, and was picked up beyond the river about 165 yards from where the engine had been standing.

It is probable that the flaw in the middle bottom plate was due to some original defect in the plate which had not shown itself when the inside of the barrel of the boiler was examined at the end of 1877, but which was perhaps first developed by the very proper tests to which the boiler was subjected in February 1878, after having been repaired.

There is no apparent blame to be attached to the conduct of any of the Company's servants as having in any way conduced to the explosion.

The Secretary, (Railway Department),
Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company.

NORTH LONDON RAILWAY.

Board of Trade, (Railway Department),
13, Downing Street, Whitehall, London, S.W., 19th November 1878.
SIR, I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 15th instant, the result of my inquiry into the circumstances connected with the collision that occurred on

the 12th instant, between a passenger train and a train of empty carriages standing alongside the platform at the Broad Street station of the North London Railway.

Four passengers and the guard of the passenger train are returned by the Company as having been injured on this occasion, and it is stated that 13 other passengers have since complained of having been shaken by the collision.

The engines attached to the two trains had both outside frames and the buffer-beams bent, and the back of the coal-box of one engine also bent, and eight vehicles in the passenger train, and seven vehicles in the empty carriage train, were damaged, but not to any great extent, as the estimate for the total amount of the damage done to the rolling stock only amounts to about £55.

In this instance, the 10.55 a.m. up train from Kew Bridge to Broad Street, which consisted of a tank engine and 10 vehicles, including two break-vans, was, by mistake, turned into a bay on which an empty train was standing alongside the platform, and ran into it at a speed variously estimated at from five to eight miles an hour.

Evidence.

Frederick Wilson, signalman about 15 years, stated that he was transferred from the London and North-western Railway Company in 1865. An empty train had been standing in No. 3 bay for about 1½ hours. He was told by the shunter that this train was to be shunted into No. 4 bay, which was done a little after 11.30 a.m. About 11.32 he was also told to run the next up train into No. 3 bay, but was rather busy at the time; and on being challenged from Skinner Street, the adjacent signal-box, he lowered the signal for No. 4 bay and cleared the road for the Kew Bridge train to come in, forgetting that the empty train was standing there on No. 4 line. There was a London and North-western train due to leave at 11.35 a.m., an empty train to shunt into No. 2 bay afterwards, and a London and North-western train to leave at 11.40 a.m. The Kew Bridge train came in at about 11.43 a.m.; it was coming in rather slowly. The shunters were carrying out their arrangements properly, and there is nobody to blame but himself. He lost sight of the fact that an empty train had been shifted into No. 4 bay. The train was coming in slower than usual, on account of having been stopped at Skinner Street signal-box. He did not find out the mistake which he had made before the train was running past the box.

James Pierce, shunter, stated that he has been a shunter for two years, and four years in the Company's service. Received orders from the foreman porter to shunt the empty train from No. 3 to No. 4 bay, and told the signalman what he was about to do, and shunted the train from No. 3 to No. 4 bay at 11.30 a.m. The engine was coupled on ready to take the train out. When he left it in No. 4 bay he did not see the Kew train come in.

Samuel Johnson, engineman of No. 106 engine, has been 14 years a driver, and 25 years in the Company's service. Left Kew Bridge at 10.55 a.m., and on arriving at Skinner Street was stopped by signal; he waited a minute till the No. 4 signal was lowered. Did not see the empty train in the bay till he was near the coal stage. He applied the rope for the front section of breaks, and sounded his whistle, and found that the train break did not take effect, owing to the shortness of the distance and the slow rate at which the train was travelling; so he reversed his engine and whistled for the rear break. The fireman also applied the engine break.

Was running at the rate of about six or seven miles an hour when he first saw the engine on the line in front. The buffer-plank of the engine was damaged. His engine was running chimney first, the other engine was tender first. Neither driver or fireman was hurt. Both engines were tank engines. He thinks he was running about five miles an hour when the collision occurred.

A. Gaunt, fireman, No. 106 engine, was working with engineman Johnson, whose evidence he corroborated.

Charles Austin, engineman, No. 108 engine, has been 12½ years a driver, and 13 years in the Company's service. Was standing in No. 4 bay, attached to a train waiting to take out the 11.55 a.m. Richmond train; and while waiting there he saw the Kew Bridge train approaching; and fearing that a collision was about to occur, he, with his fireman, jumped off the engine. There was only one blow to the incoming train. The incoming train was running at about eight miles an hour when it struck the empty train. The engine No. 108 was slightly damaged. The incoming train was not above 30 yards from his engine when he first saw it coming.

W. Clarke, fireman, No. 108 engine, has been 5½ years in the service. His evidence bore out the statement made by engineman Austin.

John Stone, guard, has been 13 years a guard, and 16 years in the Company's service. Left Kew Bridge at 10.55 a.m., and on arriving at Skinner Street was stopped by signal for about two minutes. The No. 4 signal was then lowered, and the train went on to the station. He did not see the empty train standing in the bay, neither did he hear the driver whistle for the breaks. Had his train break on, and could have stopped, if he had seen the obstruction, in about two carriage lengths. He was running at about five or six miles an hour when the collision took place, and was thrown off the seat in the van when the collision took place, and hurt his ankle and temple. There were about 50 people in the train. The train consisted of a tank engine, two first-class carriages, one composite, two second-class, and three third-class carriages, and two break-vans; he rode in the last vehicle in the train, the last break-van. He knew nothing about the collision until it occurred.

Conclusion.

From the preceding statements it appears that the up train from Kew Bridge to Broad Street station was stopped at the Skinner Street signals, which are situated about 343 yards north of the signal-box at the western side of the Broad Street station,

placed alongside of No. 4 line or bay ; and the signalman on duty in that box (F. Wilson), on being called upon by the signalman in the Skinner Street signal-box, made the road right, and lowered the up signal for the up train from Kew Bridge to enter the station on No. 4 line or bay, entirely forgetting that he had about 10 minutes before, at the request of the shunter, allowed an empty train to be moved out of No. 3 line or bay, and to be placed on No. 4 line or bay in readiness to leave the station as the train for Richmond at 11.55 a.m.; and that the shunter had also told him to let the Kew Bridge train run in on No. 3 line or bay. The signalman stated that he was the only person to blame for causing the collision, which occurred about 11.43 a.m.

The driver of the Kew Bridge train only saw that the line No. 4 on which he was entering the station, was already occupied by a train in front when he was about 60 or 70 yards from it. He states that he pulled the rope by which the front section of continuous breaks extending from the engine to the four adjacent vehicles is put on, and that he whistled for the guard's rear section of breaks, also extending over four vehicles, but the whistle was not heard by the guard, and the train breaks at the front are stated not to have acted quickly, owing to the slow pace at which the train was entering the station.

It is probable that if there had been continuous breaks throughout the whole length of the train, instead of two sections of continuous breaks at its extremities, placed under the control of the engine-driver, he would have been enabled to have prevented the collision from taking place.

The North London Railway Company was one of the earliest among railway companies to adopt continuous breaks for sections or portions of their passenger trains ; and it is stated that they have not, during the last $3\frac{1}{2}$ years, had a single failure of their breaks in making $5\frac{1}{2}$ millions of stops ; and only four instances in that time when their breaks have gone on and caused a delay of a few minutes.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 30th November 1878.

SOUTH-EASTERN RAILWAY.

Board of Trade, (Railway Department,)
SIR, 13, Downing Street, Whitehall, London, S.W., 16th November 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 8th instant, the result of my inquiry into the circumstances connected with the accident which occurred on the 5th instant to a passenger train in the act of entering the Cannon Street station of the South-Eastern Railway Company.

It is stated that no persons have complained of having been hurt on this occasion : very slight damage was done to a 6-wheeled first-class passenger carriage, and some few chairs of the permanent way were broken.

In this instance, the fifth carriage from the engine of the 6.20 p.m. down passenger train from Charing Cross to Dartford was diverted from its proper line, and pulled off the rails by the shifting of a pair of facing-points, while the train, consisting of engine and tender, and 15 vehicles, was passing over them, but the signalman having at once discovered the mistake which he had made, immediately restored the facing-points to their proper position, and the remaining carriages in the train travelled on their proper line into the station.

The facing-points here alluded to are situated about 30 yards north of the overhead signal-box at the entrance of the Cannon Street station ; they are on the eastern side of the station, and about 40 yards south of the south end of No. 9 platform, to which platform the train was running, so as to get to the eastern side of it.

These facing-points are interlocked with the signals, but not provided with a locking-bar. There are no less than 28 facing-points in this station yard, but only nine of these are furnished with locking-bars. This arises from the manner in which the station is laid out, and from the crowded state of the lines, the limited length of the station, and the short distances that intervene between different sets of facing-points, or from them to the points and crossings of other lines adjacent to them.

The evidence is as follows :—

George Carter, head guard of the 6.20 p.m. train from Charing Cross to Dartford on the 4th November, 4½ years a guard, and 5½ years in the Company's service, states : That the train consisted of a tender, engine, and 13 vehicles, including two break carriages, and I rode in the last break carriage. The train left Charing Cross at 6.25 p.m., and as the train was entering the Cannon Street station I heard some one calling out, "Break on;" when we were running about seven miles an hour. I looked out and saw a carriage off the rails. I was putting my break on when I heard the shouting, and I then put it on as quick as I could and as hard as I could. The train stopped short of its usual place on the east side of No. 9 platform. The train remained coupled together, and one carriage, a first-class, No. 1,787, the fifth from the tender, was off the rails. I did not see any passengers in that carriage. This occurred about 6.33 p.m.

George Gower, signalman six years, states : I came on duty at 2 p.m., and was there for the purpose of learning the working in the Cannon Street box, in which there are 84 levers including the shunting levers : there were two other men in that box at the time, and I was attending to the orders of one of those two signalmen. Signalman Coe called out to me, "Right 47," and by mistake I took hold of lever No. 48, and lifted it out of the slot, and as soon as I found out that I had taken hold of the wrong lever from the jarring of the lever caused by the carriage being diverted, I put No. 48 lever back into its proper place. No. 47 lever was required to be shifted for an engine going back into the middle road. I did not know that a carriage was off the road until I saw it at the platform. I felt the jerk on the lever as soon as I got lever 48 out of the slot, and I immediately put it back again. I have not been employed before in a signal-

box which has so large a number of levers in it as the Cannon Street signal-box.

George Washford, engine-driver of the 6.20 p.m. train from Charing Cross to Dartford on the 4th November, two years permanent driver and .15 years altogether in the Company's service.—We left Charing Cross about 6.24 p.m. We were running into the Cannon Street station at about from six to seven miles an hour, and the engine had passed under the signal-box when I felt a jerk as I was passing alongside of No. 9 platform. My mate's break was on a little at the time. We were running tender first, and I was standing on the engine on the side next the wall of the station building, and when I felt the jerk I stepped across the engine and by that time the train had stopped. We were in the act of stopping at the station when I felt the jerk. There was no time to do anything. When I looked back I could see fire flying from the wheels of a carriage coming in contact with the stone platform, and when I went back I found a carriage off the rails, but which was still coupled to the carriages in front and behind it. The fact of a carriage being off the rails had the effect of causing the train to be stopped before it had reached the usual place at the platform, from 30 to 40 yards before it reached that spot.

James Smith, under guard of the 6.20 p.m. train, 4½ years a guard, states : That as the train was entering the Cannon Street station he heard some one call out, "Break on." We were about three carriage lengths along the platform when I heard some one calling out : my break was not on at the time, but I put it on directly I heard some one calling out. We might be running about five miles an hour at the time.

From the preceding statements, and from personal inquiries and observations, it appears that the accident was caused by a mistake on the part of a signalman who was being trained to the working of the points and signals in the Cannon Street overhead signal-box. There were two other signalmen in the box at the time, and one of those signalmen gave the signalman under instruction orders to shift lever 47, which moved a pair of facing-points, to allow of an empty engine passing from one line to another, and through a mere mistake the signalman took hold of lever No. 48, instead of lever No. 47, and moved it out of its slot, and thus shifted the pair of facing-points of a line leading to the eastern side of No. 9 platform, over which the 6.20 p.m. passenger train was then passing. The engine (with tender in front), was at the time running alongside of the platform. The driver felt a jerk, the signalman rectified his mistake at once again by altering the points, and the sixth and remaining carriages in the train travelled on their proper line into the station; the fifth carriage (from the engine), which had been diverted, and was running off the rails, fortunately had neither of the couplings broken, which respectively attached it to the one carriage in front, and the other behind, and thus it continued to run with the rest of the train into the station, coming in contact with the bottom of the slope of the ramp at the south end of the platform. The home-signal, which was lowered by No. 41 lever for this train to enter the station as soon as the facing-points moved by No. 48 lever had been properly set for the train to enter the station, were properly interlocked with No. 48 lever, so that the facing-points could not be moved while that signal remained at "caution:" but as soon as this signal was replaced at "danger" the lock was taken off, and the points could then be shifted. There does not appear to be any special rule or instruction to the signalmen in the Cannon Street overhead signal-box with reference to trains pass-

ing into or out of the Cannon Street station, as to the exact time when the signalmen are authorised or directed to replace the home-signals (which have been lowered for the passage of a train), at "danger:" but in practice these home-signals appear to be replaced at "danger" when about one half of the length of the train has passed under the signal-box when entering the station: and in this particular case the home-signal must have been replaced at "danger" before the fifth carriage from the engine had reached the facing-points, otherwise the signalman who was under instruction could not have moved lever No. 48 by mistake, and thus shifted the points.

*The Cannon Street station was opened for traffic in July 1866, and the points and signals were then all properly interlocked with each other: but at that time the introduction of what is now termed a "locking-bar," placed in front of each pair of facing-points, and having for its object the preventing the signalman from shifting the facing-points while a train is in the act of passing over them, was not then known; nor any necessity recognised for its introduction. But two similar accidents occurred in 1875, at two different sets of facing-points in the Cannon Street station yard. Fortunately neither of these accidents have been attended with any very serious results, but it is quite impossible to say what may happen when the next accident of the same kind occurs: and on this ground I would venture to suggest that endeavours should be made to adopt some kind of "locking-bar," either in front of each pair of facing-points or beyond them, alongside of each stock-rail, so as to prevent the signalman from shifting the facing-points while a train is in the act of passing over them. In some of the numerous facing-points in this station yard, which are unprotected by "locking-bars," it appeared to me that the check or guard rails placed to cover the points of the adjacent crossing-points might be made use of as check-rails, and also as the axis of the vertical "locking-bars" used in this station yard, which are the invention of the Company's engineer (Mr. Brady). If this cannot be done, the next alternative would appear to me to be that the signalmen should be prohibited from replacing the home-signals at "danger" until the whole train has passed over the facing-points: and if on full consideration it is found that this would materially interfere with the very large amount of traffic that enters or leaves this station, the only remaining course that would effectually provide for the public safety would seem to be, that the lines in this station yard should be re-arranged, so as to get rid of this impediment to safe working, and to admit of the whole of the facing-points being properly controlled by facing-point locks and locking-bars.

It is well known that some of the most serious accidents which have hitherto happened, have been permitted to occur, by the absence of "locking-bars" placed in front of the facing-points; and the cost attendant on a single serious accident of this kind, might far exceed the cost of re-arranging the lines in the Cannon Street station yard.

*The Secretary,
(Railway Department,)
Board of Trade.*

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 27th November 1878.

TAFF VALE RAILWAY.

SIR, Railway Department, Board of Trade,
13, Downing Street, 30th October 1878.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 21st instant, the result of my inquiry into the circumstances connected with the disastrous collision which occurred on the 19th instant, at the north side of Pontypridd station, on the Taff Vale Railway, between a passenger train and a train of empty carriages in the act of being shunted from the main up line to the Rhondda branch down line, which trains were travelling in opposite directions at the time of the collision.

No less than 12 passengers were either killed on the spot, or died shortly afterwards of the injuries which they received in this collision, and 103 passengers are returned

as more or less injured on this occasion, and it is feared that some of them are injured to such an extent as to render their recovery doubtful. I enclose a list of the passengers killed and injured, supplied by the Railway Company.

In accordance with your instructions, issued at the request of the Home Department, and by the desire of the Coroner (Mr. Reece) for the Eastern Division of the County of Glamorgan, I attended at the adjourned Inquest which was held on the 24th instant at Pontypridd. The Inquest was further adjourned until the 28th instant, but the Coroner informed me that it was not necessary that I should be there.

The leading seven out of the thirteen vehicles which were in the passenger train, exclusive of the engine and tender, were damaged. The leading break van next the tender, and the following third-class carriage, were not very much damaged, but the next four third-class carriages were greatly damaged, the fourth from the break van had its body broken to pieces and swept off the under framing. The two next third-class carriages had one side and both ends broken, and under frame slightly damaged; and the last of the first six third-class carriages had one side and one end broken, and the under frame slightly damaged. A statement of the damages is attached to this Report.

Pontypridd station is situated on the main line of the Taff Vale Railway between Cardiff and Merthyr and Aberdare, and it is distant from the former town about $11\frac{1}{2}$ miles.

The Rhondda branch from Treherbert joins the main line at the north end of Pontypridd station, and the passenger traffic to and from this branch is worked from a dock lying on the western side of the up main line platform. About a quarter of a mile to the north of Pontypridd station, a short double line, 16 chains in length, called the north curve, was constructed for connecting, in an easterly and westerly direction, this Rhondda branch with the main line; double junctions having been formed at the two extremities of this curve,—that with the Rhondda branch at the western end of the curve being called the Rhondda cutting junction, and that with the main line, at the eastern end of the curve, the north curve junction.

This short connecting line was duly authorised to be opened for mineral and goods traffic in October 1872, signal-boxes having been erected at the two junctions, and the points and signals interlocked with each other. The line falls from the junction with the main line, on a gradient of 1 in 420, for a length of three chains; it is then horizontal for a distance of five chains; and from thence it rises towards the Rhondda branch on gradients of 1 in 330 and 1 in 264 for lengths respectively of six and two chains. It is properly signalled for up and down traffic.

The curve is on a very short radius of $7\frac{1}{4}$ chains. It is constructed mostly through a rock cutting, and has an over-road bridge situated near the centre of the curve; and in consequence of the sharpness of the curve, and the line being in a cutting, the view from an engine is very limited in each direction, and does not exceed 60 or 70 yards.

In September 1875 the Railway Company commenced to work a new system for the empty carriages used for the passenger traffic between Cowbridge and Pontypridd, which served as terminal stations. From that time up to the present time four passenger trains have been run daily in each direction between these places; and on the arrival at Pontypridd station of the up passenger trains from Llantrissant and Cowbridge, and after the passengers have got out of the carriages on to the up platform, the train has been drawn ahead, until the last vehicle in it has cleared the points of the north curve junction with the up main line, and then it stopped, and waited for a signal from the signalman in the signal-box for permission to push back (along the wrong road) the train of empty carriages on the up line from the Rhondda cutting junction, and thence on to the down line of the Rhondda branch.

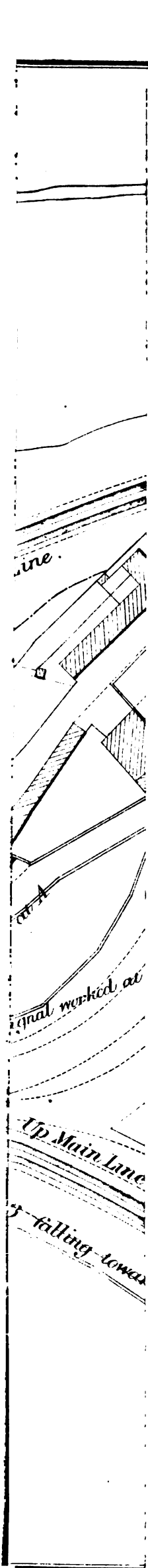
The regulations under which this shunting operation was directed to be performed are contained in the two following orders issued by the Company's traffic superintendent:—

“ TAFF VALE RAILWAY.

“ Cardiff, 22nd September 1875.

“ Until further instructions the following must be strictly observed with reference to working the Llantrissant trains of empty carriages at Pontypridd station:—

“ So soon as the passengers have all alighted, the guard will, with the carriages, proceed on the main line to the north curve junction, and will from that junction, on



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“ receiving a signal from the policeman, shunt the train on to the north curve up line
 “ so far as the Rhondda cutting junction, when, on receiving a signal from the
 “ policeman at that junction, the train will proceed on to the down main line of the
 “ Rhondda branch, the train will then draw down, the engine to take water and wait
 “ at its accustomed place before proceeding on to the down main line platform.

“ The passenger train breaksman of the Llantrissant train will, in every instance,
 “ proceed to the Rhondda cutting junction to inform the signalman that the train of
 “ passenger carriages has passed up to the north curve.

“ So soon as the down Rhondda branch passenger train has passed clear of the
 “ Rhondda cutting junction towards Pontypridd, an all-right signal of ‘ line clear ’
 “ may be sent to, and must be acknowledged by, the signalman at the north curve
 “ junction; then the Llantrissant train of carriages may be shunted on to the north
 “ curve up line.

“ While the Llantrissant train is standing upon the up main line, and until the
 “ train and engine have passed clear of the main line on to the north curve, the up
 “ main line home and distant signals of the north curve junction must be kept set
 “ at danger.

“ The home and down distant signals of the Rhondda cutting junction must be kept
 “ at ‘ danger ’ after the passing of the down Rhondda branch passenger train until
 “ that the Llantrissant train of carriages has passed out and proceeded on towards the
 “ Rhondda junction with the main line, leaving the north curve junction perfectly
 “ clear.

“ *Every precaution for the safety of these and every other engine and train must be
 “ strictly observed.*

“ JAMES HURMAN,
 “ *Traffic Superintendent.*”

“ Taff Vale Railway, Traffic Superintendent’s Office,
 “ Cardiff, 30th September 1875.

“ Commencing to-morrow, Friday, and until further instructions, the guard of the
 “ Llantrissant passenger train will, after arrival of his train at Pontypridd station,
 “ remain there in charge of parcels and letters brought by that train, and deliver same
 “ to the different trains for destination. The breaksman will, in the guard’s place,
 “ proceed with the train of passenger carriages to the north curve, and W. D. Rees,
 “ platform porter, is instructed to proceed to the Rhondda cutting junction instead of
 “ the passenger train breaksman to inform the policeman at that place that the
 “ train of passenger carriages has proceeded on to the north curve, as per instructions
 “ issued September 22nd.

“ Signed, J. HURMAN.”

The Llantrissant train referred to in these regulations corresponds with what is
 called the Cowbridge train in the evidence given to the Coroner on the 24th instant,
 and repeated and somewhat enlarged to myself on the following day, with the
 exception of that given by the Superintendent of Police.

The “ line clear ” signal, referred to in these instructions, as proper to be given by
 the signalman at the Rhondda cutting junction consisted of two beats on the gong
 and the moving of the needle, which also rings a bell of the telegraph instrument in
 the north curve junction signal-box to “ junction clear ”; and this signal had to be
 acknowledged by the signalman at the north curve junction box by one beat on
 the bell.

It should be distinctly understood, that for a train of empty carriages, in the act of
 being shunted or pushed back along the up or wrong road, there were no out-of-door
 signals to warn the driver that anything was wrong, or that there was any danger
 attendant on the shunting operation he had been signalled to perform.

The evidence is as follows:—

Mr. James Hurman.—I have been traffic superintendent of the Taff Vale Railway Company since 1873, and issue the rules and regulations for working the traffic. I produce the rules respecting the traffic on the north curve. The north curve is the short line joining the main line of the Taff Vale Railway with the Rhondda branch line. A passenger train from Cowbridge arrives at Pontypridd station, and discharges the passengers there, and proceeds on, at 4.13 p.m., for the north curve. When the empty train arrives north of the points at the north curve the train is pulled up, and waits there until a signal has been given to the driver by the signalman at the north curve junction box to proceed along the north curve. The driver of the empty Cowbridge train then pushes his train backwards along the northern or up or wrong line of the north curve on to the down line of the Rhondda branch railway. His engine and train are then in a proper position to proceed back to Cowbridge, and he proceeds down to Pontypridd station main line down platform. A passenger train from Treherbert is due at the Rhondda cutting junction at 4.15 p.m., and at Pontypridd Rhondda branch platform at 4.16 p.m. The signal between the Rhondda cutting junction box and the north junction box is an electric telegraph gong, and another bell signal, with a needle indicator; and the traffic is worked on the absolute block principle. It is the duty of the signalman at the north junction box, as soon as the empty Cowbridge train arrives at his box, to keep the train there until he receives a signal from the Rhondda cutting signal-box that the junction is clear. When the line is cleared by the passing of the Rhondda train, the signalman at the Rhondda cutting box gives two beats on his bell-instrument, to indicate to the Rhondda north box signalman that the line is clear, and he then moves the needle indicator, which shows "junction clear" to the signalman at the north junction box. The north junction signalman then has to acknowledge this signal by one beat on his bell-instrument; and he then opens the points on to the north curve, and signals the driver of the Cowbridge train to proceed, in the day-time by flags, or, as the train is close by, by lifting his hand and saying, "All right. The latter is the usual practice, but the signal by flag is the proper method. If these instructions are carried out, it is impossible that a collision between the two trains can occur, if no mistake is made by either of the signalmen. On Saturday, the 19th inst. (the day of the accident), William Roberts was the signalman on duty at the north junction box, and Stephen Ellis at the Rhondda cutting junction box. William Roberts went on duty that day at 8 o'clock in the morning. Stephen Ellis went on duty at the same time. William Roberts has been in the employ of the Taff Vale Railway Company for 34 years altogether, and out of that time he has been signalman for 28 years, or thereabouts. He bears a most excellent character for steadiness and general good conduct, and I have never heard of his having been found fault with at any time. Stephen Ellis has been in the employ of the Company also for some years. He is also a careful, steady, and sober man. The electric telegraph bell and gong signal used between the north junction signal box and the Rhondda cutting junction box is used for every train passing along the north curve up or down, and for no other purpose. It is impossible that the needle indicator can move to show the line as clear or blocked without the bell sounding, as they are worked together. Each movement of the needle indicator is accompanied by a single ring of the bell. The gong is separate from the bell, and it is the duty of the signalman to give the requisite signals on the gong at the same time. If the signalman at the Rhondda cutting box, by mistake, moved the signal to "junction clear," it would be accompanied, therefore, by one ring of the bell at the north junction box. He could alter the signal back to "line blocked" at any moment, and that would also be accompanied by one ring of the bell.

There are also error and obstruction signals, if anything goes wrong. The signalman must be in his box, otherwise he cannot see the needle indicator. The signalman at the north junction box would be able to hear the sound of the bell, and also the gong, if he was standing on the lower platform of the box, or on the ground. The engine-driver of the empty Cowbridge train is entirely dependent on the signalman at the north junction box for the "all right" signal. There are no out-of-door signals on the up line which can guide the engine-driver; but on the down line there are out-of-door signals,—both a distant and a home signal. Mineral trains, and all trains except the Cowbridge empty trains, are moved from the main line to the Rhondda line, along the down line, but the four Cowbridge empty trains daily are moved along the up line, as it is found more convenient to do so. These movements of the Cowbridge trains are governed by the special instructions which I have produced. If the driver of the Cowbridge train had looked at the down distant-signal worked from the Penrhiw box, he could have seen whether that signal was at danger or not. He could have seen it while he was proceeding round the curve, but I cannot tell at what point. If the signal was off, it would show that the Rhondda branch was occupied, and that he ought not to go on. This signal, however, is not intended for the driver of the Cowbridge empty train while the train is on the north curve. On account of the unusual system of traffic on this curve, I supplied the special instructions. I arrived at Pontypridd station about 5.5 p.m. As soon as I had got the trains away I went to the Rhondda cutting box. I looked at the dials of the electric telegraph instrument, and found that the up-line junction needle was standing at "junction blocked" from the north junction box, and also the down-line needle from the same box. The down main-line telegraphic signal from the Coke Owens upper junction was standing at "train arrived." The other needle showed down train on line; that was the Rhondda train from Treherbert, and the signal was received at 4.12 p.m. from the Coke Owens upper junction, according to the book. I then proceeded to the north junction box and saw the signalman, William Roberts, there. He made a statement to me, which I took down in his "line clear book." I wrote down as follows:—"On the Cowbridge train arriving at north curve junction, Roberts put up-line signals at danger, and turned the points for train to go on to curve. He then went out and down the steps. He (Roberts) states that he was down on the stairs, and he thought on coming up he heard the bell signal beat two, and told the driver 'all right.' The train passed on to curve. On Roberts coming into the lodge he found his mistake; no signal had been given; but it was too late to stop the Cowbridge train." I further wrote the following remark:—"Block instrument stood, on my seeing it at 6.12 p.m., up-line junction blocked, down-line junction blocked." Those would be the signals given from the Rhondda cutting box to the north junction box. Roberts also wrote to me on Monday, the 21st inst., as follows:—

"North Curve Junction Box,
Pontypridd.

"Sir,

"I beg to inform you that the Cowbridge carriages arrived at this lodge on Saturday last at 4.13 p.m. They came to a standstill above the points leading into the Rhondda cutting; I then opened the points ready, and then went down on to the first landing to speak to John Morgan, driver. In going up the stairs into the lodge I thought that I heard the bell ring twice. I then said 'all right' to John Morgan to go through the cutting, and when I got to the instrument I found the needle to junction blocked, and I then found out my error.

"I am, &c.,

"WILLIAM ROBERTS,
"Police, North C. J."

This is all in his own handwriting. The working of the empty Cowbridge trains along the curve commenced in 1875; that curve was first opened for traffic in October 1872. This is the first accident which has happened on it. I put in the report of the damage to the rolling stock which was caused by the collision; there was no damage to speak of to the permanent way. The two last vehicles of the empty Cowbridge train were thrown off the rails, and three carriages of the Rhondda train,—the 3rd, No. 36, third class; 4th, No. 65, third class; and 5th, No. 62, third class. The other vehicles remained on the rails. I put in also a list of the persons killed and injured in this collision.

John Morgan.—I reside at Cowbridge. I am an engine driver in the employ of the Taff Vale Railway Company, and have been 28 years in the Company's service, and driving 23 years. I am a goods train driver, and relieve the Cowbridge passenger train driver twice a week. On Saturday last, the 19th instant, I drove a passenger train from Cowbridge to Pontypridd, arriving at the latter place at 4.11 p.m. After discharging the passengers at Pontypridd station I went on the main line to the north Rhondda cutting; I pulled up there north of the points. My fireman, Morgan Aubrey, was with me on the engine; and Peter Griffiths, the under-guard or breaksman, was also with the train, and rode in the last vehicle. The other guard remained at Pontypridd station platform. After I pulled up above the points I walked back from the engine to the bottom of the stairs of the signal cabin, and took a small parcel from the signalman, who came down the stairs. I received it from his hands, but I won't be sure he came to the bottom of the steps. The parcel was something private for myself. The signalman then went up the steps, and I walked back to my engine. The signalman then sang out "All right." There are two platforms on the steps of the cabin,—one just outside the door, and the other half-way down. I would not be sure where the signalman was when he gave me "All right." He was not in his box, however. I did not see the signalman make any movement with a flag or with his hand when he called out "All right." Then the under-guard at the back of the train showed me an "all right" signal with his hand. We remained there about a minute and a half. The under-guard was much nearer the signal-box than I was. I think the signalman had hardly time to go into the box and come out again between the time when I spoke to him and when he gave me the "all right." When I got the "all right" signal I pushed back through the north curve. The five carriages were then travelling in front of the engine. As near as I could guess, we went at from four to five miles an hour through the curve. There was no out-door signal to show me whether the Rhondda line was clear or not. I had entirely to depend upon what the signalman told me, as to whether I should go on or not. After I had gone under the bridge of the Craig wen parish road in the curve I could see the down distant-signal of the Rhondda branch, which is worked from the Penrhiw junction turntable if I looked for it, but we never do look for that signal. The bridge I speak of is on the Rhondda side of the middle of the curve. I did not look at the Penrhiw signal. It has nothing to do with our progress on the north curve. The guard and fireman saw the Rhondda train first, and the latter said "Hold on." The fireman was on the north side of the engine. I could then see the engine of the Rhondda train on the crossing or junction. The fireman then put the break on, and I reversed the engine at once, but I was unable to stop my train in time, and it crashed into the other. I did not feel any shock of the collision. I did not hear any gong or bell sounded in the north signal-box. I never do hear the bell sound there. I was on the south side of the engine as I pushed back. My train was in motion when the collision occurred, but the steam was off to enable me to pull up north of the points; but it had very nearly come to a stand. I did not notice the position of the

points at the north junction; they were right for my engine to go into the cutting, but I do not know when they were opened. As I passed the north junction box before I came to a stand I saw the signalman on the platform just outside the door of his signal-box. He made some motion to me, which caused me to get off the engine, and walk back for the parcel. I did not notice the signalman when I was setting back along the north curve. I have been about 29 years in the service of the Company, and for 22 years as engine-driver. My train remained all coupled up together after the collision. Two vehicles were thrown off the rails—the guard's break carriage at the rear of the train, and a second-class carriage next to it. I have never been pulled up before when shunting the Cowbridge empty passenger train back along the north curve. I have been signalled by the north junction signalman before, from the top landing outside of the box. As a rule, the signal is given by flag by day, and by lamp at night.

Morgan Aubrey.—I reside at Cowbridge. I have been a fireman in the employ of the Taff Vale Railway Company for seven years, and between 12 and 13 years in the service. I was fireman of the Cowbridge empty train that met with the accident. I did not notice the signalman as we first passed the north junction signal-box. I was on the engine. I remained on the engine while the driver got off. I did not notice the signalman until we were setting back. When the driver came back to the engine, I heard the signalman call out "All right," but I did not see him. Then the driver sent the train back along the north curve. The signalman was in the box as we were setting back. I saw him through the window of his box. We had passed over the points when I saw him in the box. We did not exceed five miles an hour when we went through the curve; it was about four or five miles an hour. I was on the north side of the engine. I saw the hand of the breaksman, who was in the van at the tail of the train, signalling us to stop. He called out, and held out his hand. I did not see the Rhondda train at that time. I then put on the break, and the driver reversed the engine, but we could not prevent the collision. The collision took place within a second of time after seeing the breaksman's signal. The driver had reversed before the collision occurred. The steam was off before we passed under the overbridge. The engine was about 25 yards on the Rhondda side of Craig-wen bridge when the breaksman signalled us to stop. I could point out the spot.

Peter Griffiths.—I reside at Cowbridge. I have been a breaksman and guard for a period of nearly nine years in the employ of the Cowbridge and Taff Vale Railway Company, and, previous to that, yard foreman in the service of the Great Western Railway Company, and acted as breaksman to the Cowbridge train on Saturday last. I was in the break carriage, which was the last vehicle of the train, when we proceeded to the north junction. I saw the signalman as we passed up on the main line before we stopped. He was then inside the box. My break-carriage was about three or four yards from the signal-box and north curve points when the train came to a stand. The signalman came down to the second landing after we stopped. I first noticed the position of the points when the signalman came on to the second landing after we had stopped. The points were then right for setting back on the north curve. I saw the driver of our train go to the bottom of the steps of the signal cabin, and talked to the signalman. I did not see the signalman come below the second or lower landing of the steps, or the driver go up to him. I did not see a parcel handed to the driver by the signalman. The signalman gave us "all right" to go on the north curve from the lower platform. He said "All right," and gave the hand-signal. The signalman remained on the lower landing from the time when he spoke to the driver until he gave

us "all right." I did not hear the bell or gong sound in the signal-box. I hardly ever hear the bell or gong signal there; but I have heard it occasionally when we come to a standstill at that point. We always do come to a stand there. We stopped about two minutes at the north junction before we moved back into the north curve. We always stop there about the same time for "line clear." The gong might be sounded before we get to the junction. We proceeded along the north curve on receiving the "all right" signal from the signalman. I signalled "all right" to the driver when I got the signal from the signalman. I think we were travelling about four or five miles an hour when we passed under the over-bridge. My break carriage was about 55 yards from the Rhondda train when I first saw the Rhondda train engine. I then put the break on with one hand, and signalled to the fireman of our train to stop. I was on the north side of the break carriage. I could not see the fireman, as I could not put out my head while I had my hand on the break. The first thing I saw at the junction was the engine of the Rhondda train. Our train then ran into the Rhondda train. I was at my post until the collision occurred, and I afterwards got out through the door on the north side. I opened the door. Our train was going about two or three miles an hour when the collision happened. The speed had been lessened. The break carriage in which I was, was falling against the rock in the cutting when I jumped out. The bank thus saved me, as I was in the space underneath. With the exception of the north side, my carriage was completely smashed. My break carriage was canted up on one side when I got out. There were five vehicles in my train besides the engine. Two were thrown off the rails—the break carriage entirely, and the trailing wheels of the carriage next to it, a composite. The couplings were not broken or unhooked. I saw two carriages in the Rhondda train off the rails. I believe that the carriages in the train remained coupled together. I have never been stopped in going through the curve before.

David Thomas.—I reside at Treherbet. I am an engine driver on the Taff Vale Railway. I have been so for about 26 years, and for 17½ years a passenger train driver. I was driving the down Rhondda passenger train which leaves Treherbet at 3.35 p.m., and which is due at Pontypridd 4.16 p.m., on Saturday last. The signals at the Rhondda cutting junction were at "all right" for me to pass. As we were passing the junction points my fireman, Shadrach Okey, said "Look out, Davy, the Cowbridge is into us!" I was on the west side of the engine at the time, and the fireman on the opposite side. I did not see the Cowbridge empty train. I at once reversed the engine. I felt a very slight jerk on the engine. The Cowbridge train first struck the break-van next to the tender, grazed the two following third-class carriages, and then badly smashed the third and fourth carriages, which were third-class carriages. Some of the wheels of some of the carriages were off the rails. I believe the collision occurred just as I was in the act of reversing. As near as I could judge, we were travelling at a speed of about eleven miles an hour at the time of the accident. My train consisted of engine and tender, break-van, six third-class carriages, a break carriage, one first-class carriage, one second-class carriage, two third-class carriages, and a break-van at the tail of the train. We were running very nearly to our time at the junction. I never saw the Cowbridge train in the north cutting before, when I have been in the act of passing towards Pontypridd station. I was running into Pontypridd station at somewhat less speed than usual, owing to a thick fog and very greasy rails. The steam had been shut off for about a mile and a half from the station.

Shadrach Okey, of Treherbet.—I am a fireman in the employ of the Taff Vale Railway Company, and have been 13 years in the service of the Company.

I was fireman to the Rhondda train driven by David Thomas on the 19th inst. The signals were "all right" for us when we approached the Rhondda cutting junction. Just as we got to the junction I saw the empty Cowbridge train in the cutting approaching. The nearest carriage of that train was only about seven or eight yards from me when I first saw it. I was on the left side of the engine, or the side nearest the Cowbridge train. I at once put on the break, and called out to my driver. I should say the Cowbridge train was going at four or five miles an hour when it struck us. We were going about 10 or 11 miles an hour at the time. I never before saw the Cowbridge train on the north curve when we were passing the Rhondda cutting junction towards Pontypridd. We travelled about 10 or 15 yards after the collision had taken place. We were travelling at rather less than our usual speed at the time of the collision, because the rails were so greasy, and on account of the fog.

Stephen Ellis.—I reside at Pontypridd. I am a signalman in the employ of the Taff Vale Railway Company, and have been in their employ 12 or 13 years in all. I shall have been signalman two years next December in the present (Rhondda cutting) signal-box. I was on duty in the signal-box at the Rhondda cutting junction box last Saturday. I came on duty at eight o'clock in the morning. A passenger train from Treherbet to Pontypridd passes my box at 4.15 p.m. When this train has passed, it is our duty to signal to the man at the north Rhondda junction box that the line is clear for the empty Cowbridge train to proceed along the north curve to the Rhondda cutting junction. I give two taps on the telegraph plunger of the instrument, to sound the gong in the north Rhondda junction box, and put the needle over to "junction clear," and that would cause the bell in the north Rhondda box to ring once. The north Rhondda box signalman then gives one beat on the gong as an acknowledgment of my signal. Then the train comes on to the down Rhondda line. On the 19th inst. I did not give the signal that the line was clear, because the 4.15 p.m. down Rhondda train had not passed. The down Rhondda train came to our junction at the proper time. I entered the 4.15 p.m. in my "line clear" book as the time of arrival when the Rhondda train was about 20 or 30 yards above my box. It had not then reached my box. The Rhondda train was going from about 10 to 12 miles an hour, which is about the usual rate. Just as the Rhondda train passed my box I saw the empty Cowbridge train coming. The junction points are about four yards from my box. The engine of the Rhondda train did not break loose. There was no one standing upon the line just before the collision occurred. The Cowbridge train has never before come along the north curve before I have given "line clear." I am quite positive I gave no such signal to the north junction box on this occasion. I had entered in my "line clear book" that I had given "line clear" for the empty carriage train, but I gave no such signal. I make the entries beforehand to save time. I am quite sure I did not signal line clear for the Cowbridge train. I can sound the gong without moving the needle, but I did not do so. There was no one in my box at the time of the accident. I heard no beat on the gong from the north junction box before the collision. The lampman who attends to the railway lamps had been in my box, but left about 10 minutes before the collision.

Jabez Matthews, superintendent of police.—I took the signalman Roberts into custody on Sunday night. I told him I should take him in custody on the charge of neglecting his duty, by allowing the empty Cowbridge train to pass along the north curve, and causing the collision. He told me that he thought of coming to see me on the following morning. I left him at his house in charge of a constable. I saw him at the police station to which he was brought on the Monday morning. I told him that in consequence of the collision 12 persons had been killed. He

made the following statement :—“That the Cowbridge train arrived at my lodge at 4.15 p.m., and when she came to a standstill I turned the points and went outside, and when I was on the second landing I thought I heard the bell ring twice. I then said, ‘John,’ or ‘Jack, the line is clear,’ and held my hand out. They then backed along the line through the cutting. I then went up to the lodge, and when I got in sight of my instrument I found out my error, that the needle was at ‘junction blocked,’ and I did not know what to do. I went outside, and the train was then going round the curve out of sight.”—I then took him before the magistrates, and he was bailed out. Roberts said on the Sunday night, “All that I have to say in the matter I told Mr. Hurman, and it is written down in my book.”

William Roberts, signalman at North Rhondda

junction signal-box states :—I gave permission to the empty Cowbridge train to proceed along the curve to the Rhondda branch, under the impression that I had heard the bell signals from the Rhondda branch signal-box ; but on returning into my box I found out too late that I had made a mistake, as the telegraphic instrument showed that the junction was blocked. I joined the Taff Vale Railway in 1843 as a horse boy. I next became mineral train breaksman in 1844, and lost my leg while in that capacity, through an accident while serving as a breaksman in 1847. I became a signalman in 1848, and remained at one station for 25 years, until 1873. I was then removed, at my own request, to Llantrissant junction, still acting as a signal-man, and was there three years. I was placed in the north junction signal-box at Pontypridd in 1876. I have never had any serious mishap during the whole of this time.

From the preceding evidence, and the Company's working time-tables, it appears that the 2.15 p.m. up passenger train from Cowbridge to Pontypridd station, consisting of an engine and tender, and five carriages, arrived at Pontypridd station at its appointed time on Saturday, the 19th instant; and after the passengers had all got out, the train was drawn ahead to the north curve junction, and pulled up and stopped, when the last vehicle, a break-carriage, had passed over the points, and waited there for a signal from the signalman to set back along the up line of the north curve towards the Rhondda cutting junction. The train got to the north curve junction at 4.15 p.m. As the train approached the north curve junction, the signalman, William Roberts, came out of his signal-box, having, previously to doing so, shifted the junction points to enable the train to set back; and he gave some signal to the engine-driver of the train, John Morgan, which caused the latter to get off his engine, and to walk back to the bottom of the steps leading to the elevated signal-box, when the signalman handed him a packet, either from the lower landing-place half-way up the steps leading to the upper landing-place at the door of the signal-box, or from the steps. The engine-driver is uncertain where the signalman was standing when he handed over this parcel.

The signalman, Roberts, then went up the steps, and the engine-driver walked back to his engine; and the signalman, before he re-entered his signal-box, called out “All right;” and the breaksman, who was riding in the break-carriage at the tail of the train, which had stopped nearly opposite to the signal-box, gave an “all right” signal with his hand, to the engine-driver to set back, and the train backed along the up line, towards the Rhondda cutting junction, at a speed which is stated not to have exceeded four or five miles an hour.

The signalman, William Roberts, stated that as he went up the steps leading to the signal-box, he thought he heard two rings of the bell from the Rhondda cutting signal-box, and then he gave the signal, by calling out “All right,” for the train to proceed; but on entering his signal-box, he saw the needle of the telegraphic instrument standing at “Junction blocked,” and he then found out the mistake which he had made, as he had no right to give the “all right” signal until the needle had been moved to “Junction clear”; but he had no means of stopping the train.

The 3.35 p.m. down passenger train from Treherbert to Pontypridd, on the day in question, consisted of an engine and tender, and 13 vehicles, arranged in the following order: a break-van, six third-class carriages, one break-carriage, one first-class, one second-class, two third-class carriages, and one break-van; and this train was due at Pontypridd at 4.16 p.m.

It is stated to have been running very nearly to its appointed time, and at a rate of speed of about 11 miles an hour, the signals being “all right” for the train to run into the station; and as it passed over the Rhondda cutting junction points, the fireman (Shadrach Okey), who was standing on the left side of the engine, called out to the engine-driver (David Thomas), who was on the right side of the engine, “Look out, Davy, the Cowbridge train is into us.” The engine was running at the time without the steam being on, and had been so running for more than a mile, and the driver at once reversed, but he believes the collision occurred as he was in the act of reversing. He never saw the empty Cowbridge train before the collision took place.

The empty Cowbridge train when setting back occupied a length of about 53½ yards; and the breaksman, Peter Griffiths, who was riding in the break-carriage at the rear of the train, which in backing had become the leading vehicle, informed me, that he was about 55 yards from the Rhondda branch down passenger train when he first saw

it coming towards him ; that he put his break on with one hand, and signalled to the driver and fireman of his own train with his other hand, out of the window ; this signal is stated to have been observed ; and he thinks that his train was running two or three miles an hour when the collision happened. The empty Cowbridge train is said to have struck the break-van next to the tender of the engine of the Rhondda branch down passenger train, grazed the two following third-class carriages, and badly smashed the third and fourth third-class carriages from the break-van.

Three carriages in the passenger train were thrown off the rails, and the break carriage and composite carriage next to it of the empty Cowbridge train were also thrown off the rails, but in neither train were the couplings broken.

The signalman, William Roberts, deserves great credit, in my opinion, for having admitted the mistake which he had made by calling out "all right" to the driver of the empty Cowbridge train, as a signal for him to set back his train towards the Rhondda cutting junction. If he had not made this admission, it would have appeared exceedingly doubtful whether the accident was due to his mistake, or to mistake of the signalman, Stephen Ellis, in the Rhondda cutting junction signal-box, who had, "to save time," made entries in his "line clear book" that he had given "line clear for the empty carriage train" to pass from the north curve junction,—when he states that he had not given any such signal, and had made erasures in his book to excuse himself ; a very irregular and improper proceeding. I believe that this is frequently done, and, as it is most objectionable, every endeavour should be used to try and put down the practice.

The signalman, William Roberts, has been 35 years in the Company's service. Four years after entering the service, and while acting as a breaksman, he lost a leg, and for the last 30 years he has acted as a signalman, and remained for 25 years at one station. He has been employed since 1876 at the north curve junction signal-box, and has never had any serious mishap during the whole of his service as a signalman. He is said to bear a most excellent character for steadiness and general good conduct.

This fearful collision has resulted from an improper and dangerous mode of working the Cowbridge empty train of passenger carriages at Pontypridd station, since the year 1875.

When this north curve junction line was opened for mineral and goods traffic in 1872, the regulations (which are annexed) under which the two junctions were directed to be worked, dated the 21st October 1872, contained the following order:—

" 7. Engines and trains must always travel *upon the proper road* when proceeding "on to or from the Pontypridd north curve."

The italics are not mine ; and if this regulation had been maintained, the passage of the empty passenger train would have been properly controlled by out-of-door signals, worked from each junction signal-box, for the guidance of the engine-driver.

The enormous advantage gained, as far as the safe travelling of the public is concerned, by the introduction of interlocked points and signals, was altogether lost by the shunting along the wrong line of this empty passenger train, according to the new instructions which were issued in 1875.

It is quite true that if these regulations had been strictly observed, the collision would not have happened ; and it is equally certain that it was directly caused by the mistake made by the signalman, William Roberts, in giving the "all right" signal to the driver of the Cowbridge empty passenger train to set back along the north curve, when he had not received the proper signal from the signalman at the Rhondda cutting junction, giving him permission to allow that train to proceed.

The collision resulted from an error in the working of the absolute block system, by a mistake of a signalman in the working of traffic on a wrong line of railway, not provided with out-of-door signals to check any mistake which a signalman might make.

I have now therefore to recommend, for the consideration of the Directors and Officers of the Taff Vale Railway Company, that this mode of working along the curve should be abandoned without any unnecessary delay ; that a cross-over road should be put in on this north curve, close to the north curve junction, to enable the train of empty carriages to be crossed to the down line, and thus avoid running on the wrong line ; that as this curve is only used for mineral and goods and not for passenger traffic, blind sidings and catch sidings on each line should be introduced in the usual manner, to prevent any goods or mineral trains being drawn or backed out on to the passenger lines without the consent of the signalmen at the two junctions ; and as the curve is short, I think it desirable that this sharp curve should be guarded throughout its

length by check rails, to prevent any vehicles from getting off the rails which might afterwards run foul of the passenger lines.

I do not think that any blame attaches to the Company's servants who were with the two trains at the time when the collision took place.

The Secretary,
Railway Department, Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

APPENDIX.

COLLISION AT PONTYPRIDD. October 19th, 1878.

Deaths.

Davies, Evan Owen,	aged 38, of Dowlais	} at Pontypridd.
Thomas, David,	" 50, of Porth	
Jones, John,	" 24, of Treallaw	
Clarke, Thos. Phillip,	" 35, of Cardiff	
Thomas, Sarah,	" 70,	
James, Phoebe,	" 61, of Aberdare	
Davies, David,	" 53, of Aberdare	
Lloyd, David,	" of Porth	
Davies, John,	" 24, of Hafod	
Parry, Jeremiah,	" 47, of Heolfach	}
Parry, Mary Ann,	" 45, of Heolfach	
Ratigan, Patrick,	" 67, of Pontypridd at Cardiff Infirmary.	

Injuries.

Name.	Occupation.	Residence.	Nature of Injury.
Williams, J.	Saddler	Chapel St., Pontypridd.	Bruise of shoulder.
Lewis, Wm.	Not stated	Pwllawn, Graigwen.	Contusion of right leg and chest.
Richards, James	Draper	Treforest	Injury, left knee.
Lewis, Thomas	Not stated	Graigwen	Bruised head and left shoulder.
Watkins, William	Labourer	Pontshonron.	Contusion and bruise, left thigh.
Morgan, Thomas	Moulder	Tramroad Side, Treforest.	Contusion of face, slight injury to head, and loss of teeth.
O'Donnell, Mrs.	-	High Street, Pontypridd	Contusion head, face, and body.
Rosser, Barbara, Miss.	-	Llwynpia	Leg broken, both bones.
Walters, David	Labourer	Penygraig	Compound fracture, both legs.
Beard, Wm.	-	Troorky	Severely bruised about head.
Morgan, John	-	Treforest	Severe contusions and bruises.
Harris, Mary	-	Heolfach-Ystrad.	Compound fracture, right leg, and dislocation of wrist.
Williams, Thomas	-	Llantrissant	Fractured ribs.
Jones, Wm.	-	Llwynpia	Both legs fractured.
Married woman	-	Penydarren	Both legs hurt.
Phillips, Lewis	-	Pentre Ystrad	Hand bruised.
James, John	-	Do.	Much unnerved.
Rowlands, Evan	-	-	Severely scratched.
Thomas, George	In Iron-works.	Beaufort	Contusions, each leg.
Thomas, Wm., son of above.	-	Do.	Scratches, each leg.
Not known	Publican	Vaynor	Severely. Not expected to live.
Jones, son of Mrs.	Bookseller	High Street, Merthyr.	Roof of mouth knocked in
Powell, Moses	Collier	Tyne-ydd	Bruised leg and severe shaking.
Morgan, Miss Alice.	-	Ystrad	Bruised legs, and shock.
Jones, Miss J.	-	Glanynant	Contusion, right calf, and shock.
Frazer, Mr.	-	-	Bruises and shaken.
Phillips, Margt. Ann.	-	Mountain Ash	Bruised arm and leg, and shaken.
Jones, Jno. L.	Painter	Ystrad, 100, High St., Merthyr.	Left leg and face bruised.
Marshall, Frank	Working for Mr. Davies.	Treherbert	Slightly injured.
Jones	-	Hopkin's Town.	Injured arms, shoulders, and legs.
Crockett	-	Tonyrefail	Rupture and bruise of leg.

Name.	Occupation.	Residence.	Nature of Injury.
Morgan, Wm., jun.	-	Danygrove	Sprain and contusion, calf and leg.
Williams, son of Mr.	-	Canton	Said to be severely injured.
Gardner, son of Mr.	-	Do.	Shock.
Quick, Sidney	-	Treforest	Abrasion of cheek, contusions, and swelled ankles.
Walters, David	Collier	Llwynpia	Both legs broken.
Thomas, David	Not stated	Ton, Ystrad	Arms, back, and left leg injured.
Thomas, Gwenllian. Wife of do.	-	Do.	Wound right side of head, and left leg injured.
John, Rees	Collier	Do.	Badly shaken, and complaints of leg.
Dorington, Chas.	Mason	Pontypridd	Teeth and head injured.
Williams, Henry	Painter	Coed Penmaen.	Leg and arms, fracture of thigh.
Thomas, Elizabeth	-	Ystrad	Head.
Beard, John	Quarryman	Pontypridd	Head cut, body bruised, and contusions.
James, Iago	Not stated	Treherbert	Lacerated wound, with contusions right leg, and other injuries.
Higgs, George	Do.	Pontypridd	Both thighs badly bruised.
Parker, George	Do.	Do.	Abrasion of left fore-arm near elbow, and contusions.
Williams, Evan	Do.	Ystrad	Both legs broken.
Cross, Tom or Wm.	Labourer	Treforest	Right leg broken.
Evans, John	Platelayer	Porth	Fracture of both thighs.
Twain, S.	Telegraph lineman.	Cardiff	Fracture of ribs, lower jaw left thigh and leg.
Manning, John	Labourer	Stormstown, Pontypridd.	Injury to back and legs.
Griffiths, Sarah	-	Swansea	Fracture of left leg near ankle joint.
Karalick, George	Builder	Penygraig	Amputation of right leg.
Jones, Edwin	Collier	Heolfach	Fracture of both legs.
Morris, Wm.	Do.	Dowlais	Fractured patella and wounds.
Cook, Chas. or Jas.	Miner	Burton, Somerset.	Contusions left eye.
Parry, Wm. James	Collier	Ystrad	Contusions and contusions.
Morgan, John	Not stated	Tony Pandy	Amputation of left leg.
Davies, David	Boiler-maker.	Aberdare	Fracture of left thigh.
Jones, William	Not stated	Heolfach	Sprain of right instep and contusions.
James, William	Mason	Aberdare	Severe scalp wound and slight contusions.
Evans, William	Collier	Trealaw	Fracture of right leg.
Jones, William	Timberman	Tony Pandy	Fractured thighs, right leg, wound of right thigh, wound in left popliteal.
Jones, Thomas	Tailor and draper.	Dowlais	Dislocation of hip.
Mies, Henry	Moulder	Mountain Ash	Compound fracture of left leg, wound of lower lip, abrasion of right leg and cheek.
Phillips, Catherine	-	Gilfach Goch	Right and left legs bruised.
Harris, Thomas	Collier	Ystrad	Left leg broken.
Harris, Edward	Do.	Heolfach	Fractured leg and rib.
Richards, Morgan	-	Coed Penmaen.	Contusion and lacerated wound and bruises and right leg.
Jones, John	-	Coedraw	Contusion of right ankle joint.
George, David	-	Duffryn Terrace, Fern-dale.	Forehead cut; right foot badly injured.
George, John	-	Do.	Swelling on foot.
Nicholas, David	-	Do.	Two legs slightly bruised.
Evans, John	-	Underhill House, Ferndale.	Legs bruised, and back of head much swelled.

Name.	Occupation.	Residence.	Nature of Injury.
Polgrain, James	Engine driver.	Pontygraith	Bruised chest.
Davies, Willm.	Collier	12, Union St., Ferndale.	Leg injured.
Evans, Sarah Jane.	- - -	Llwynpia	Left side of head and face, and shock nervous system.
Jones, John	- - -	Owm Clydach.	Bruised face, hand, hip, and spits blood.
Lewis, David	- - -	Do.	Lacerated wound on head.
Rogers, F. H.	- - -	Tony Pandy	Leg and head and nervous shock.
Jones, Mary Ann	- - -	Llwynpia	Shock. No external marks.
Badham, Wm.	- - -	4, Edward St., Canton.	Wound right temple and general shock.
Morris, Wm.	- - -	- - -	Injured head.
Cross, George.	- - -	- - -	- - -
Boy, unknown.	- - -	- - -	- - -
James, David	Sinker	Havod	Cut on leg and neck.
Williams, Danl.	Collier	Cymmer	Slightly injured.
Griffiths, Mrs.	- - -	Porth	Fractured leg, slight wound on head.
Morgan, Wm.	Carpenter	Tonyrefil	Slightly injured.
Evans, Mary Ann	- - -	Llwynpia	Shock.
Morgan	- - -	Ton Ystrad	Bruised.
Wife of Do.	- - -	Do.	Do.
Thomas, gy. Roberts, John Pugh, Owen	Collier	Dowlais.	- - -
Morgan, Sarah	- - -	53, High St., Tredegar.	Walking lame. Apparent injury to knee.
- - -	- - -	Brook St., Ystrad, now at 22, Cross St., Pen-y-darren.	Contusion right arm and shoulder, and right side, and left hip and leg. Had two fits at Merthyr. Subject to fits.
Phillips, David	Collier	Pentre	Contusion right hand, and bruise on right ankle.
Name unknown	- - -	Tonyrefil	Slightly injured.
Do.	- - -	Ferndale	Do.
Do. (female)	- - -	Do.	Do.
Williams, Thos.	Collier, Llwynpia.	2, Union St., Tredegar.	Contusion right knee and calf of leg.
Williams, Jenkin	- - -	Cowbridge	Reported himself to station agent as injured, but denied by Dr. Slani-street.
Granger, Mrs.	- - -	Cymmer	Leg and arm bruised, cut over eye.
Granger (son of Do.)	- - -	Do.	Left leg injured.

This is a list made up to to-day's date, Friday, October 25th, 1878. J. HURMAN.

Sir,

I beg to hand you particulars of the carriages damaged in collision on the Rhondda branch on 19th inst.

Carriages belonging to Cowbridge train.

No. 7.—Guard's carriage (old stock): both ends and one side broken, one sole bar and one headstock broken, wheels have been knocked from under, one axle broken, and one bent. This is loaded up in a 10-tons truck.

No. 3.—Composite: two first class and two second class compartments (old stock), one end broken in, one headstock and steps broken.

Carriages in Rhondda train.

No. 1.—Passenger break van (old stock): one headstock and two step irons broken.

No. 12.—Third-class smoking carriage: one side and one end broken, the opposite only slightly damaged. Underframe slightly damaged.

No. 36.—Third-class, five compartments (old stock): doors on one side slightly damaged. Three pillars broken, steps knocked off, one headstock broken.

No. 39.—Third-class, five compartments (old stock): one side broken up, five pillars on opposite side forced out, lower tensions broken.

No. 55.—Third class (new stock), five compartments: body broken to pieces, entirely off underframe. Roof only slightly damaged; will do again.

No. 65.—Third class (new stock), five compartments: the whole of one side of body and the seats are

broken, both ends broken, the doors on opposite side are not damaged; some of the side panels and the roof can be used for rebuilding; one headstock and steps broken.

No. 52.—Third-class, five compartments (new stock): one side and both ends broken; the doors on other side, and the roof, can be used again; the underframe only slightly damaged.

G. Fisher, Esq.,
General Manager.

Yours, &c.,
T. VENNING.

TAFF VALE RAILWAY.

BLOCK TELEGRAPH REGULATIONS for working the NORTH CURVE at PONTYPRIDD.

BLOCK TELEGRAPH REGULATIONS.

General Instructions.

1. The signalling of trains by electric telegraph does not in any way dispense with the use of station and distant signals, hand signals, or fog signals, whenever and wherever such signals may be requisite to protect obstructions on the railway.

2. Every signalman is held responsible for keeping his telegraph signal-box strictly private, and he is not, under any circumstances, to allow any other than the authorised telegraph or police inspectors to enter or remain in it. Any infringement of this regulation will render him liable to dismissal.

3. The instruments and apparatus are to be kept perfectly free from dust, dirt, grease, &c.

Description of Instruments.

4. The dial of the instrument is divided into two parts, one part being for the up trains, the other part for the down trains. Each instrument has two needles or indicators; one black, the other red. The black indicator is the last signal received at the station. The red indicator is the last signal sent from the station. Each signal station is furnished with a bell for the up section, and a gong for the down section. The normal position of the needles will be "junction blocked."

5. The "signal" instruments and bells are to be devoted exclusively to signalling of trains. The signalmen must not use them for any other purpose, nor may they, under any circumstances whatever, use any private codes, nor make any exceptional use of them; and the authority to work them is entrusted solely to the signalman or person in charge for the time, by whom alone the signals are to be passed.

6. Great responsibility rests upon the signalmen and others in charge of the telegraph to comply strictly and accurately with the following regulations, and to be most watchful and attentive to their duties.

Code for Bells and Gongs.

7. The following signals must be given with extreme care and steadiness, allowing a slight pause between each stroke, so as to prevent confusion by the blending of one signal with another. The plungers of the instruments are also to be pressed in gently, but firmly, and with great care. The attention of signalmen is expressly directed to these points:—

Is junction clear? - - - 2 beats on bell or gong.
Yes, clear - - - 2 beats on bell or gong.

*Down train or engine "will start" - - - 3 beats on gong.

*Down train or engine "arrived" - - - 4 beats on bell.

*Up train or engine "will start" - - - 3 beats on bell.

*Up train or engine "arrived" - - - 4 beats on gong.

- Acknowledgment of a signal - 1 beat on bell or gong.
 *Obstruction signal, "No, blocked" - 5 beats on bell or gong.
 Error signal - 7 beats.
 Inspector's signal for testing instruments - 6 beats on bell or gong.
 Signal of "line clear" after obstruction has been removed - 4 beats given and taken twice.
 *"Stop and examine approaching train" - 10 beats on bell or gong.

* The signals marked with an asterisk (*) must be repeated by the receiving station, and the needle placed to "Junction blocked" or "Junction clear," (as the case may be), which must be acknowledged by the sending station (when correct) by one beat.

8. "Stop all," or "Block code.—Five beats is the signal to stop everything. Two signals of four beats each, given and taken twice, is the signal that the obstruction is removed.

Regulations for Signalling.

UP TRAINS.

(From the Rhondda Branch to the Main Line.)

9. Neither train nor engine may be allowed to pass from the Rhondda cutting junction on to the north curve towards the main line, unless the indicator of the instrument from the Pontypridd north box stands at "Junction clear," and then only after the passing of the following signals:—

10. Before starting a train or engine, the signalman at the Rhondda cutting junction will give two steady beats on the bell to the signalman at the main line junction, signifying, "Is junction clear?" If the main line is clear to receive such train, the signalman at the main line junction will reply, "Yes, clear," by giving two steady and distinct beats on his gong. The Rhondda cutting junction signalman will then signal, "Train will start," by giving three distinct beats on his bell, which the main line junction signalman will repeat on his gong, and immediately place his needle over to "Junction clear." This will be acknowledged by the Rhondda cutting junction signalman by one beat on the bell. The train may then proceed on to the north curve. So soon as the train or engine has passed clear of the curve on to the main line, the main line junction signalman will inform the Rhondda cutting signalman, by giving four distinct beats on his gong. This will be repeated by the Rhondda cutting signalman on his bell. The main line junction signalman will then place his needle to its normal position, "Junction blocked," which the Rhondda cutting signalman will acknowledge by one beat.

11. The arrival signal is not to be given until the section or signal station is actually clear and ready to receive another train on the same line, nor until the signalman has satisfied himself that the whole of the train has passed, and that no vehicles have broken away and remain on the line to obstruct the passage of a following train.

12. When the Rhondda cutting junction signalman announces an up train or engine to the main line junction signalman, and the main line should not be clear to receive the train or engine, the signalman at the main line junction will reply by giving the "Obstruction signal" (five beats on the gong), keeping his needle to "Junction blocked." The Rhondda cutting junction signalman will repeat these signals, and the repetition must be acknowledged by one beat from the main line junction signalman. The Rhondda cutting junction signalman must then stop the down train or engine at his box, and, cautioning the driver, will admit the train or engine on to the north curve, so as to clear the main line of the Rhondda branch, giving the driver strict instructions to observe the main line junction signalman's home signals. On the home signals being set to "All right," the train or engine may proceed on to the main line. So soon as this is done, the signalman at the main line junction must

send the arrival signal to the Rhondda cutting junction signalman.

DOWN TRAINS.

(From the Main Line Junction to the Rhondda Cutting Junction.)

13. On the approach of a main line down train or engine for the Rhondda branch, the signalman at the main line junction will indicate the same to the Rhondda cutting signalman by two beats on his gong. If all be clear at the Rhondda cutting junction and the train can go through, the Rhondda cutting junction signalman will repeat the signal of two beats on his bell, placing his needle to "Junction clear," which the main line junction signalman will acknowledge by one beat on his gong. The train may then proceed on to the north curve. So soon as the train or engine has passed clear of the curve on to the Rhondda branch, the "Arrival signal" (four beats on the bell) must be given by the Rhondda cutting signalman on his bell, which must be repeated by the main line junction signalman; the Rhondda cutting junction signalman will then replace his needle to its normal position, "Junction blocked," which must be acknowledged by one beat on the gong by the main line junction signalman.

14. When the main line junction signalman announces a down train or engine to the Rhondda cutting junction signalman, and the Rhondda branch should not be clear to receive the train or engine, the signalman at the Rhondda cutting junction will reply by giving the "Obstruction signal" (five beats on the bell), keeping his signal to "Junction blocked." The main line junction signalman will repeat these signals, and the repetition must be acknowledged by one beat from the Rhondda cutting junction signalman. The main line junction signalman must then stop the down train or engine at his box, and, cautioning the driver, will admit the train or engine on to the north curve so as to clear the main line, giving the driver strict instructions to observe the Rhondda cutting signalman's home signals. On the home signals being set to "All right," the train or engine may proceed on to the Rhondda branch. So soon as this is done the signalman at the Rhondda cutting junction must send the arrival signal to the main line junction signalman.

15. No telegraph signal is complete until repeated or acknowledged by the station to which it is sent. If a signal is not so repeated or acknowledged, it must be given until this is done, and the irregularity must be reported to the traffic superintendent.

16. Should an incorrect signal have been accidentally sent, or a signal not be clearly understood, seven beats must be given on the bell or gong; the correct signal must then be given.

17. When the block telegraph is out of order, the drivers of trains must be instructed to proceed with great caution.

Line Clear Train Books.

18. The times at which "Junction clear" is received, "Time of departure of train," and time of receipt of signal "Train has arrived," are to be carefully entered in the "Line clear book," and the signature of the signalman placed opposite to the entries. The book is always to be left open in a convenient position near the instrument.

19. It will be understood that the entries of time of signals in the "Line clear book" must be the time when the signals themselves are given or received, and not the time when the train leaves or arrives, unless, of course, when the times of the former and of the latter are the same.

20. The time, therefore, at which the signals are given and taken is to be entered in its appropriate column in the "Line clear book," every column of which is to be duly filled up. It must be understood

that anything under half a minute is not to be counted; the minute hand once past the point of division, the time entered must be that of the next division; thus, a signal given or received at 0.31½ minutes will be entered as 0.32. The entries are to be made in ink, direct into the "Line clear book," and they must follow each other in order of time. The full date and headings are to be entered before beginning each day's signals.

21. Obstruction danger signals given or received are to be entered in the column for the line so obstructed, similar to the entry of an ordinary train signal, with the word "Obstruction" in the column for "Description of train."

22. Signalmen are expressly forbidden to make any erasure whatever in their "Line clear book." If any error be made in entering a train in the book they must allow the entry to stand, drawing the pen through it in such a manner that it may still be read, and then make the correct entry immediately beneath the erroneous entry.

23. When signalmen change duty, a line must be drawn across the book; the signalman leaving duty will enter the time of leaving, and sign his name above this line; and the signalman coming on duty will enter the time of coming on duty, and sign his name below the line. This will be followed by the usual entries of the signals made during the incoming signalman's turn of duty, and he will be held responsible for all entries made below the line during such turn.

Testing Instruments, &c.

24. The inspector's signal of six beats on the bell or gong, accompanied by the shifting of the indicator from left to right, is only to be used by that person for testing and examining the instruments, and is to be acknowledged each time by an exact repetition. As soon as the examination of the instrument is completed, one beat on the bell or gong will be given by the inspector, which is to be acknowledged.

N.B.—Instruments must never be tested or interfered with when a train has been signalled by them, and is running between the two points.

25. In case of any failure of the train-signalling instruments, the signalman must immediately report the same by telegraph direct to the telegraph inspector or lineman in charge at Cardiff Docks, and the traffic superintendent.

Out-Door Signals.

26. After the departure or passing of any train or engine, the fixed signals (station and distant) for this section must be kept standing at "Danger" until the "Line clear" or "Train arrived" signal of such train or engine is received from the next signal station in advance.

GEORGE FISHER,
General Manager.

TAFF VALE RAILWAY.

On and after Monday, October 21st, 1872, the following stopping times for passenger trains, and instructions, are to be strictly observed at

PONTYPRIDD NORTHERN JUNCTION.

The arms and lamps on the auxiliary signal post repeat the signals shown by the down junction home arms and lamps.

On the auxiliary signal post the uppermost arm and lamp indicate the signals for main line down engines and trains, and the lowest arm and lamp for engines and trains intending to proceed from the down main line to the Pontypridd north curve.

1. Neither up engine nor train is to pass from this junction to *proceed towards Aberdare junction*, after the commencement of an interval of 20 minutes previous to the time of arrival at this junction of every up mail and up passenger train, *until such up mail or passenger train has passed this junction leaving a clear road.*

2. Except as provided in No. 3 of these instructions, no engine or train may proceed from the down main line at this junction on to the Pontypridd north curve, after the commencement of an interval of 15 minutes previous to the time of every up passenger train and up mail train being due at this junction, until after the up passenger train or up mail train has passed clear of this junction.

3. Whenever a main line up passenger train is late, after waiting for *ten minutes* after the appointed time of the main line up passenger train being due at this junction, if such up passenger train then be not in sight or heard approaching, any engine or train waiting upon the down main line may be allowed to proceed on to the Pontypridd north curve if the road be clear. In every such instance the up main line junction home and distant signals *must first be set at danger, and these signals must remain at danger* until the up main line be quite clear. The distant signals may then be altered from *danger*.

4. The roads of the main line at this junction must, except as provided in No. 3 of these instructions, be in every respect clear for a period of *ten minutes* before the time of every mail train and of every passenger train, whether up or down, being due at this junction, and these roads must be kept clear until that every such mail train or passenger train has passed leaving a clear road.

5. The greatest care must be taken that neither engine, train, nor vehicle on any road be allowed near the crossing of a main road during the time that any engine or train is approaching to pass or is passing that crossing, and until that main road be again clear.

6. *Passenger trains are not to run*, either up or down, upon the roads of the Pontypridd north curve, unless special instructions, signed by the traffic manager, be given to the signalman at the junctions of the Pontypridd north curve, authorising these signalmen to allow the passenger train or trains mentioned in such instructions to proceed on to or from the road or roads of the Pontypridd north curve.

7. Engines and trains must always travel *upon the proper road* when proceeding on to or from the Pontypridd north curve.

8. Enginemen are strictly to observe the following signals by sounding the engine whistle for passing from or to the Pontypridd northern junction:—

For passing from the Pontypridd north curve on the up main line—*four times short*:

For passing from the down main line on to the Pontypridd north curve—*three times prolonged*.

9. Enginemen to up main line engines and trains approaching Pontypridd northern junction must not pass the post *painted red*, and fixed beside the up main line below the Pontypridd northern junction crossing, until after they have received the proper signal from the signal pole at Pontypridd northern junction as well as by the hand signals from the signalman at that junction. *By night* a lamp fixed upon this post will show a *green light*.

10. No engine or train is to proceed from the Pontypridd north curve on to the up main line if an up main line engine or train be approaching, nor until after such up main line up engine or train has passed the junction crossings, leaving the through road perfectly clear.

11. Enginemen about to proceed from the Pontypridd north curve on to the up main line *must not*

take their trains or engines beyond the post painted red, and fixed beside the up road of Pontypridd northern curve near the Pontypridd northern junction, until after they have received the proper signal from the signal pole at Pontypridd northern junction as well as by the hand signal from the signalman on duty at that junction. *By night* a lamp fixed on this post will show a green light.

12. No engine or train is to proceed from the down main line on to the Pontypridd north curve if an up main line engine or train be approaching, nor until after such up main line engine or train has passed this junction leaving a clear road.

13. There must be a clear interval of *ten minutes* between the times of main line passenger trains and trains of passenger carriages following each other at this junction, or on to or from the Pontypridd north curve; during this interval the home signals of the road occupied must show *danger*, and they must show *caution* for a further interval of *five minutes*. *This rule requires especial attention with down main line trains when the preceding passenger train or train of passenger carriages has to stop at Pontypridd station.*

14. There must, at this junction, be a clear interval of *ten minutes* after the time of every down passenger train and train of passenger carriages having to stop at Pontypridd station, before any down mineral or goods or ballast train or engine with break van or empty engine may be allowed to pass this junction on the same road, during this interval the home signals of the road upon which the passenger train is travelling must be kept at *danger*; *caution* by both home signals and hand signals must be shown for a further interval of *five minutes*.

15. There must be a clear interval of *five minutes* between the times of departure of all engines, or engines with only break vans, and of all trains except passenger trains and trains of passenger carriages, whether up or down, following each other; also, except as provided in Nos. 13 and 14 of these instructions, before any engine or a train of any other description be allowed to follow any passenger train or train of passenger carriages. During this interval the home-signals of the road upon which the preceding engine or train is travelling must *all be set at danger*. *Caution* by both home and hand signals must be shown for a further interval of *five minutes*.

16. *Engines and trains at this junction are to give precedence as follows:—*

Mineral, goods and ballast engines and trains to proceed from the down main line on to the Pontypridd north curve are to give precedence to up main line passing engines and trains.

Mineral, goods and ballast engines and trains intending to proceed from the Pontypridd north curve towards Aberdare junction are to give precedence to up main line passing engines and trains.

17. Whenever a passing up main line engine or train, and an engine or train upon the down main line, to proceed to the Pontypridd north curve, are at the same time approaching this junction, the junction distant, auxiliary, and home signals to the *down engine or train* must all be set at *danger*, and the *down engine or train* must remain clear above the junction points until that the main line up engine or train has passed the junction crossings, leaving a clear road.

18. Whenever an engine or train upon the Pontypridd north curve intending to proceed towards Aberdare junction, and an up main line passing engine or train, are at the same time approaching this junction, the junction home and distant signals must be set at *danger to the engine or train upon the Pontypridd north curve*, and the engine or train upon the Pontypridd north curve must be brought to dead stand

beyond and clear of the post painted red on the Pontypridd north curve, and must there remain until after the up main line engine or train has passed this junction, leaving a clear road.

19. Whenever and so long as the signals are altered for an up main line engine or train to pass this junction, the up and down junction home and distant signals to the Pontypridd north curve, also the down auxiliary signals to the Pontypridd north curve, must *all be set at danger*. These signals must be kept at *danger* until after the up engine or train has passed the junction crossings, leaving a clear road.

20. Whenever and so long as the home-signals are altered to pass an engine or train from the Pontypridd north curve on to the up main line, the up main line home and distant signals must *all be set at danger*.

21. Whenever and so long as the signals are altered for a down main line engine or train to pass this junction, the down home and auxiliary signals to engines intending to proceed on to the Pontypridd north curve must *all be set at danger*.

22. Whenever and so long as the signals are altered to pass an engine or train from the down main line on to the Pontypridd north curve, the up main line home and distant signals, also the down main line home, auxiliary, and distant signals, must *all be set at danger*.

23. The home-signals at this junction must be kept at *danger*, and may only be altered to *caution* to pass an engine or train on a clear road; before altering a signal the signalman must, by careful examination, satisfy himself that everything is safe and clear for the passing of the approaching engine or train.

24. Whenever and so long as the down distant signals to Pontypridd junction show *danger*, the down main line home and auxiliary signals at Pontypridd northern junction must also show *danger*. Approaching down main line engines and trains having been brought to *almost dead stand* above the Pontypridd northern junction, may be allowed to proceed with *great caution* towards the point of obstruction below Pontypridd northern junction. For this purpose the signalman on duty at Pontypridd northern junction will show *caution* by his hand signals to the approaching engine or train, at the same time keeping his home signals at *danger*.

25. So soon as every engine or train has passed a distant-signal, that signal must be set at *danger*, and must remain so set until that the main line or main road be again clear to beyond the home-signals.

26. Whenever there is, or is about to be, any obstruction on either main line or main road between the distant-signal and home-signal, the distant signals to the road obstructed or about to be obstructed must be set at *danger*, and must remain so set until that the main line or road be again clear to beyond the home-signals.

27. By day the *green hand-flag* held steadily denotes *caution*; the *red hand-flag* held steadily signifies *danger*; if moved up or down or violently the red flag signifies *great danger*.

28. The signalman must very frequently observe the signals fixed to indicate the position of each facing point; they must see that it gives a *clear and distinct signal as to which line the points are set for*, and that it works true with the points.

29. The signalmen and all officers and servants of the Company are required to use every exertion to maintain the safe uninterrupted passage of all engines and trains, whether on the main lines or passing on to or from the Pontypridd north curve.

30. The signalmen are required frequently and carefully to examine the working condition of the points, crossings, signals, levers, and other apparatus for working the signals, and to be very careful in

signaling engines and trains, as wrong or imperfect signals may result in serious accident. Every defect must at once be reported to the engineer and traffic manager.

31. All other rules for conducting and working the traffic at this junction are to be strictly observed.

32. Every neglect or disobedience of those regulations, and every act of insubordination, is to be instantly reported. If considered necessary, the investigation of the case and punishment of every offence is to be subject to the provisions of the 5th and 6th Victoria, cap. 55, or to such other Act as may be considered most applicable to the offence.

Cardiff,
19th October 1872.

EDWIN E. PAGE,
Traffic Manager.

TAFF VALE RAILWAY.

On and after Monday, October 21st, 1872, the following stopping times for passenger trains, and instructions, are to be strictly observed at the

RHONDDA CUTTING JUNCTION of the PONTYPRIDD NORTH CURVE.

1. Neither engine nor train is to pass at this junction from the Pontypridd north curve to proceed towards Coke Ovens sidings, after the commencement of an interval of *twenty minutes* previous to the time of arrival at this junction of every up passenger train, *until such up passenger train has passed this junction, leaving a clear road.*

2. Neither engine nor train is to pass at this junction from the Pontypridd north curve to proceed towards Coke Ovens sidings after the commencement of an interval of *fifteen minutes* previous to the time of every down passenger train being due at this junction, until after the down passenger train has passed clear of this junction.

3. The main roads at this junction must, in every respect, be clear for a period of *ten minutes* before the time of every passenger train, whether up or down, being due at this junction, and these roads must be kept clear until that such passenger train has passed, leaving a clear road.

4. The greatest care must be taken that neither engine, train, nor vehicle on any road be allowed near the crossing of a main road during the time that any engine or train is approaching to pass or is passing that crossing, and until that main road be again clear.

5. *Passenger trains are not to run* either up or down upon the roads of the Pontypridd north curve, unless special instructions, signed by the traffic manager, be given to the signalmen at the junctions of the Pontypridd north curve, authorising the signalmen to allow the passenger train or trains mentioned in such instructions to proceed on to or from the road or roads of the Pontypridd north curve.

6. Enginemen to up main road engines and trains approaching Rhondda cutting junction must not pass the post *painted red*, and fixed beside the up main road below the Rhondda cutting junction crossing, until after they have received the proper signal from the signal pole at Rhondda cutting junction, as well as by the hand signals from the signalman at that junction. *By night* a lamp fixed upon this post will show a *green light*.

7. Engines and trains must always travel *upon the proper road* when proceeding on to or from the Pontypridd north curve.

8. Enginemen are strictly to observe the following signals by sounding the engine whistle for passing from or to the Rhondda cutting junction :—

For passing from the Pontypridd north curve on to the up main road—*three times short*.

For passing from the down main road on to the Pontypridd north curve—*three times short*.

9. No engine or train is to proceed from the Pontypridd north curve on to the up main road if a down main road engine or train be approaching, nor until after such down main road engine or train has passed the junction crossings, leaving the through road perfectly clear.

10. No up engine or train is to proceed from the Pontypridd north curve on to the up main road, unless the up main road be clear for the engine or train to proceed onwards, or in the event of the engine or train having to proceed into the Coke Ovens sidings by their lower junction, unless there be room in those sidings for engine or train to pass into those sidings, leaving the main road perfectly clear.

11. Enginemen about to proceed from the Pontypridd north curve on to the up main road *must not take their trains or engines beyond the post painted red*, and fixed beside the up road near the Rhondda cutting junction, until *after they have received the proper signal* from the signal pole at Rhondda cutting junction as well as by the hand signal from the signalman on duty at that junction. *By night* a lamp fixed on this post will show a *green light*.

12. There must be a clear interval of *ten minutes* between the times of main road passenger trains and trains of passenger carriages following each other at this junction, or on to or from the Pontypridd north curve. During this interval the home signals of the road occupied must show *danger*, and they must show *caution* for a further interval of *five minutes*. *This rule requires especial attention with down trains when the preceding passenger train or train of passenger carriages has to stop at Pontypridd junction station.*

13. There must, at this junction, be a clear interval of *ten minutes* after the time of every down passenger train and train of passenger carriages having to stop at Pontypridd junction station, before any down mineral or goods or ballast train, or engine with break van, or empty engine, may be allowed to pass this junction. During this interval the home signals of the road upon which the passenger train is travelling must be kept at *danger*; caution by both home signals and hand signals must be shown for a further interval of *five minutes*.

14. There must be a clear interval of *five minutes* between the times of departure of all engines, or engines with only break vans, and of all trains except passenger trains and trains of passenger carriages, whether up or down, following each other; also, except as provided in No. 13 of these instructions, before any engine or a train of any other description be allowed to follow any passenger train or train of passenger carriages. During this interval the home signals of the road upon which the preceding engine or train is travelling must *all be set at danger*. *Caution* by both home and hand signals must be shown for a further interval of *five minutes*.

15. *Engines and trains at this junction are to give precedence as follow :—*

Mineral, goods, and ballast trains and engines to proceed from the Pontypridd north curve on to the up main road, are to give precedence to down main road passing engines and trains.

Mineral, goods, and ballast trains and engines intending to proceed from the Pontypridd north curve towards Coke Oven sidings are to give precedence to up main road passing engines and trains.

16. Whenever a passing down main road engine or train and an up engine or train upon the Pontypridd north curve are at the same time approaching this junction, the junction distant and home signals to the

up engine or train upon the Pontypridd north curve must all be set at danger, and the up engine or train upon the Pontypridd north curve must be brought to dead stand clear beyond the junction crossings until that the main down road engine or train has passed the junction crossings, leaving a clear road.

17. Whenever an engine or train upon the Pontypridd north curve proceeding towards Coke Ovens sidings and an up main road passing engine or train are at the same time approaching this junction, the junction home and distant signals must be set at *danger to the engine or train upon the Pontypridd north curve, and the engine or train upon the Pontypridd north curve must be brought to dead stand beyond and clear of the post painted red on the Pontypridd north curve, and must there remain until after the up main line engine or train has passed this junction, leaving a clear road.*

18. Whenever and so long as the signals are altered for an up main road engine or train to pass this junction, the up junction home and distant signals to the Pontypridd north curve must *all be set at danger.* These signals must be kept at *danger* until after the up main road engine or train has passed the junction crossings, leaving a clear road.

19. Whenever and so long as the home signals are altered to pass an engine or train from the Pontypridd north curve on to the up main road, the home and distant signals to the up main road and to the down main road must *all be set at danger.*

20. Whenever and so long as the signals are altered for a down main road engine or train to pass this junction, the home and distant signals to engines and trains intending to proceed on to the Pontypridd north curve must *all be set at danger.*

21. Whenever and so long as the signals are altered to pass an engine or train from the down main road on to the Pontypridd north curve, the down main road home and distant signals must *all be set at danger.*

22. The home-signals at this junction must be kept at *danger*, and may only be altered to *caution* to pass an engine or train on a clear road. Before altering a signal the signalman must, by careful examination, satisfy himself that everything is safe and clear for the passing of the approaching engine or train.

23. Whenever and so long as the up home-signals to Coke Ovens sidings show *danger*, the up home signals at Rhondda cutting junction must *all show danger.* If necessary, the junction up distant-signals upon the main road as well as upon the Pontypridd north curve must also show *danger.*

21. So soon as every engine or train has passed a distant signal, that signal must be set at *danger*, and must remain so set until that main road be again clear to beyond the home-signals.

25. Whenever there is or is about to be any obstruction on either main road between the distant-signal and home-signal, *the distant-signals to the road obstructed or about to be obstructed must be set at danger*, and must remain so set until that the main road or roads be again clear to beyond the home-signals.

26. Hand signals only may be shown to engines and trains shunting into or from any siding or sidings, or from one main road to another main road, *in every such instance the distant-signals to the road about to be obstructed must be set at danger* until that the main road be again clear.

27. By day, the *green hand-flag* held steadily denotes *caution*; the *red hand-flag* held steadily signifies *danger*; if moved up or down or violently the *red flag* signifies *great danger.*

28. The signalmen must very frequently observe the signals fixed to indicate the position of each facing points. They must see that it gives a *clear and distinct signal as to which line the points are set for, and that it works true with the points.*

29. The signalmen and all officers and servants of the Company are required to use every exertion to maintain the safe, uninterrupted passage of all engines and trains, whether on the main roads, or passing on to or from the Pontypridd north curve, or on to or from the Coke Ovens sidings.

30. As there is a very great amount of shunting at, into, and from the lower junction of the Coke Ovens sidings, close to the Rhondda cutting junction, it is particularly required of the signalman at the Rhondda cutting junction, as well as at the lower junction of the Coke Ovens sidings, that they *be most careful* in signalling engines and trains, as wrong or imperfect signals may result in serious accident. These signalmen are required frequently and carefully to examine the working condition of the points, crossings, signals, levers, and other apparatus for working the signals. Every defect must at once be reported to the engineer and traffic manager.

31. All other rules for conducting and working the traffic at this junction are to be strictly observed.

32. Every neglect or disobedience of these regulations, and every act of insubordination, is to be instantly reported. If considered necessary, the investigation of the case and punishment of every offence is to be subject to the provisions of the 5th and 6th Victoria, cap. 55, or to such other Act as may be considered most applicable to the offence.

EDWIN E. PAGE,
Traffic Manager.

Cardiff, October 19th, 1872.

Printed copies of the above report were sent to the Company on the 16th November 1878.

RAILWAY ACCIDENTS.

R E T U R N S

OF

ACCIDENTS AND CASUALTIES

**AS REPORTED TO THE BOARD OF TRADE BY THE SEVERAL RAILWAY COMPANIES
IN THE UNITED KINGDOM,**

During the Months of January, February, and March 1879,

In pursuance of the Regulation of Railways Act (1871), 34 & 35 Vict. cap. 78;

TOGETHER WITH

**REPORTS OF THE INSPECTING OFFICERS OF THE
RAILWAY DEPARTMENT TO THE BOARD OF TRADE**

UPON

CERTAIN ACCIDENTS

Which were inquired into.

**Presented to both Houses of Parliament by Command of Her Majesty.
21st April 1879.**



L O N D O N :

**PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
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1879.

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Summary of Accidents and Casualties which have been reported to the Board of Trade as having occurred upon the Railways in the United Kingdom, during the months of January, February, and March 1879.

I.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c.

Accidents to trains, rolling-stock, permanent-way, &c. caused injury to 126 persons, viz. :—

		Killed.	Injured.
Passengers	- - - - -	—	98
Servants of companies	- - - - -	—	28
Total	- - - - -	—	126

During the three months there were reported 8 collisions between passenger-trains or parts of passenger-trains, by which 18 passengers and 1 servant were injured; 23 collisions between passenger-trains and goods or mineral-trains, engines, &c., by which 69 passengers and 13 servants were injured; 10 collisions between goods-trains or parts of goods-trains, by which 12 servants were injured; 22 cases of passenger-trains or parts of passenger-trains leaving the rails, by which 4 passengers were injured; 2 cases of trains running into stations or sidings at too high a speed, by which 5 passengers were injured; 327 failures of tyres, 1 servant being injured; 98 failures of axles, 2 passengers being injured; and 1,187 broken rails, 1 servant being injured.

Of other casualties, in which no personal injury was inflicted, there were 2 cases of goods-trains or parts of goods-trains, engines, &c. leaving the rails; 1 case of a passenger-train travelling in the wrong direction through points; 23 cases of trains running over cattle or other obstructions on the line; 19 cases of trains running through gates at level-crossings; 3 cases of failure of machinery, springs, &c. of engines; 11 failures of wheels; 4 failures of couplings; 1 failure of a bridge; 6 slips in cuttings or embankments; and 1 other accident.

Of the 327 tyres which failed, 22 were engine-tyres, 8 were tender-tyres, 1 was a carriage-tyre, 11 were van-tyres, and 285 were wagon-tyres; of the wagons, 207 belonged to owners other than the railway companies; 229 tyres were made of iron, and 94 of steel, while the material of 4 was not stated; 21 of the tyres were fastened to their wheels by Gibson's patent method, 10 by Beattie's patent, and 1 by Mansell's patent, all of which remained on their wheels when they failed; 292 tyres were fastened to their wheels by bolts or rivets, of which 6 left their wheels when they failed; 3 tyres were secured to their wheels by various other methods; 74 tyres broke at rivet-holes, 97 in the solid, 5 at the weld, and 151 split longitudinally or bulged.

Of the 98 axles which failed, 43 were engine-axles, viz., 36 crank or driving, and 7 leading or trailing; 1 was a tender-axle, 1 was a carriage-axle, 52 were wagon-axles, and 1 was an axle of a salt-van. 20 wagons and the salt-van belonged to owners other than the railway companies. Of the 36 crank or driving-axles, 24 were made of iron, and 12 of steel. The average mileage of 21 iron axles was 193,999 miles, and of 10 steel axles 168,472 miles.

Of the 1,187 rails which broke, 1,121 were double-headed, 54 were single-headed, 3 were of the bridge pattern, and 8 were of Vignoles' section, whilst the section of 1 was not stated; of the double-headed rails, 726 had been turned; 1,092 rails were made of iron, and 95 of steel.

II.—ACCIDENTS TO PASSENGERS FROM CAUSES OTHER THAN ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., INCLUDING ACCIDENTS FROM THEIR OWN WANT OF CAUTION, OR MISCONDUCT; ACCIDENTS TO PERSONS PASSING OVER LEVEL-CROSSINGS; TRESPASSERS; AND OTHERS.

Of the 114 persons killed and 155 injured in this division, 20 of the killed and 114 of the injured were passengers. Of the latter, 5 were killed and 12 injured by falling between carriages and platforms; 1 was killed and 82 were injured by falling on to platforms, ballast, &c., when getting into or alighting from trains; 5 were killed and 2 injured whilst passing over the line at stations; 7 were injured by the closing of carriage-doors; 4 were killed and 7 injured by falling out of carriages during the travelling of trains; and 5 were killed and 4 injured from other causes. 16 persons were killed and 8 injured whilst passing over railways at level-crossings, viz., 10 killed and 8 injured at public level-crossings, 5 killed at occupation crossings, and 1 killed at a foot-crossing. 68 persons were killed and 20 injured when trespassing on the railways; 6 persons committed suicide on railways; and of other persons not specifically classed, but mostly private people having business on the Companies' premises, 4 were killed and 13 injured.

III.—ACCIDENTS TO SERVANTS IN THE EMPLOY OF RAILWAY COMPANIES OR CONTRACTORS, CAUSED BY THE TRAVELLING OF TRAINS OR THE MOVEMENT OF VEHICLES USED EXCLUSIVELY UPON RAILWAYS.

During the three months there were 105 servants of companies or contractors reported as having been killed and 433 injured, in addition to those included in Division I.* Of these 5 were killed and 76 injured whilst coupling or uncoupling vehicles; 1 was killed and 10 were injured by coming in contact, whilst riding on vehicles during shunting, with other vehicles, &c., standing on adjacent lines; 14 were injured whilst passing over or standing upon buffers during shunting; 3 were killed and 60 injured in getting on or off, or by falling off engines, wagons, &c. during shunting; 1 was killed and 18 were injured whilst breaking, spragging, or chocking wheels; 1 was killed and 10 were injured whilst attending to ground points, marshalling trains, &c.; 1 was killed and 26 were injured whilst moving vehicles by capstans, turn-tables, props, &c., during shunting, and 3 were killed and 41 injured by various other accidents during shunting operations; 2 were killed and 2 injured by falling off engines, &c., during the travelling of trains; 1 was killed and 5 were injured by coming in contact with over-bridges or erections on the sides of the line during the travelling of trains; 3 were killed and 10 injured whilst getting on or off engines, vans, &c. during the travelling of trains; 1 was killed and 11 were injured whilst attending to, or by the failure of, machinery, &c. of engines in steam; 22 were killed and 42 injured whilst working on the permanent-way, sidings, &c.; 1 was killed and 1 injured whilst attending to gates at level-crossings; 39 were killed and 46 injured whilst walking, crossing, or standing on the line on duty; 6 were killed and 23 injured by being caught between vehicles; 8 were killed and 21 injured by falling or being caught between trains and platforms; 5 were killed and 11 injured whilst walking, &c. on the line on the way home or to work; and 2 were killed and 6 injured from various other causes.

Altogether, the numbers of persons killed and injured on railways in the United Kingdom in the course of public traffic, during the months of January, February, and March 1879, as reported to the Board of Trade, were as follows:—

	Killed.	Injured.
Passengers :		
From accidents to trains, rolling-stock, permanent-way, &c.	—	98
By accidents from other causes	20	114
Servants of companies or contractors :		
From accidents to trains, rolling stock, permanent-way, &c.	—	28
By accidents from other causes	105	433
Persons passing over railways at level-crossings	16	8
Trespassers (including suicides)	74	20
Other persons not coming in above classification	4	13
Total	219	714

* For a classification of the injuries, see Table No. 6.

Note.—In addition to the above, the Railway Companies have reported to the Board of Trade, in pursuance of the 6th Section of the Regulation of Railways Act, 1871, the following accidents which occurred upon their premises, but in which the movement of vehicles used exclusively upon railways was not concerned, namely:—18 passengers injured whilst ascending or descending steps at stations; 8 injured by being struck by barrows, falling over packages, &c. on station platforms; 6 injured by falling off platforms; and 1 killed and 10 injured from other causes. Of servants of companies or contractors 101 were injured whilst loading, unloading, or sheeting wagons; 28 were injured whilst moving or carrying goods in warehouses, &c.; 3 were killed and 34 injured whilst working at cranes or capstans; 1 was killed and 21 were injured by the falling of wagon-doors, lamps, bales of goods, &c.; 78 were injured by falling off, or when getting on or off, stationary engines or vehicles; 1 was killed and 39 were injured by falling off platforms, ladders, scaffolds, &c.; 1 was killed and 32 were injured by stumbling whilst walking on the line or platforms; 17 were injured whilst attending to stationary engines in sheds; 6 were injured by being trampled on or kicked by horses; 3 were killed and 39 injured whilst working on the line or in sidings; and 26 were injured from various other causes. 1 person who was transacting business on the companies' premises was also killed and 18 others were injured, making a total in this class of accidents of 11 persons killed and 481 injured.

Thus the total numbers of personal accidents reported to the Board of Trade by the several railway companies during the three months amount to 230 persons killed and 1,195 injured.

TABLE No. 1.

GENERAL TOTAL.

NUMBER of PERSONS reported, during the Months of January, February, and March 1879, as KILLED or INJURED on the Railways of the UNITED KINGDOM, distinguishing between PASSENGERS, SERVANTS of the COMPANIES or of CONTRACTORS, and OTHER PERSONS ; and distinguishing also in the case of the Two former Classes between ACCIDENTS caused by ACCIDENTS to TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., and ACCIDENTS happening otherwise.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
From accidents to trains, rolling-stock, permanent-way, &c. -	-	90	-	8	-	-	-	98
By accidents from other causes, including accidents from their own want of caution, or misconduct - - -	17	113	3	1	-	-	20	114
SERVANTS :—								
From accidents to trains, rolling-stock, permanent-way, &c. -	-	21	-	7	-	-	-	28
By accidents from other causes, including accidents from their own want of caution, or misconduct - - -	80	372	21	59	4	2	105	433
OTHER PERSONS :—								
Whilst passing over railways at level-crossings - -	16	6	-	-	-	2	16	8
Trespassers - - -	47	16	15	3	6	1	68	20
Suicides - - -	4	-	1	-	1	-	6	-
Miscellaneous, not included in either of the above - -	4	9	-	3	-	1	4	13
TOTAL - - -	168	627	40	81	11	6	219	714

N.B.—The Board of Trade state the cause of accident as returned by the Companies, but do not guarantee or otherwise adopt the statement, except in cases where an official inquiry has been held.

TABLE No. 2.

NUMBER of PERSONS reported, during the Months of January, February, and March 1879, as KILLED or INJURED in the UNITED KINGDOM by the TRAVELLING of TRAINS or the MOVEMENT of VEHICLES used exclusively upon Railways, distinguishing between PASSENGERS, SERVANTS of RAILWAY COMPANIES, and OTHER PERSONS, and classifying as far as practicable the Nature and Causes of the Accidents occasioning the Death or Injury.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
From accidents to trains, &c., see Table No. 3.	—	90	—	8	—	—	—	98
From falling between trains and platforms	3	11	2	1	—	—	5	13
From falling on to the platform, ballast, &c. when getting into or out of trains	1	82	—	—	—	—	1	82
Whilst crossing the line at stations	5	2	—	—	—	—	5	2
By the closing of carriage doors	—	7	—	—	—	—	—	7
From falling out of carriages during the travelling of trains	3	7	1	—	—	—	4	7
By other accidents	5	4	—	—	—	—	5	4
TOTAL	17	203	3	9	—	—	20	213
SERVANTS :—								
From accidents to trains, &c., see Table No. 3.	—	21	—	7	—	—	—	28
Whilst coupling or uncoupling vehicles	3	67	2	9	—	—	5	76
By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines	1	10	—	—	—	—	1	10
Whilst passing over or standing upon buffers during shunting	—	10	—	4	—	—	—	14
When getting on or off or falling off engines, waggons, &c., during shunting	2	40	1	19	—	1	3	60
Whilst breaking, spragging, or chocking wheels	1	16	—	2	—	—	1	18
Whilst attending to ground-points, marshalling trains, &c.	—	8	1	2	—	—	1	10
Whilst moving vehicles by capstans, turntables, props, &c., during shunting	1	25	—	1	—	—	1	26
By other accidents during shunting operations, not included in the preceding	2	37	1	4	—	—	3	41
From falling off engines, &c., during the travelling of trains	2	1	—	1	—	—	2	2
By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains	1	3	—	2	—	—	1	5
When getting on or off engines, vans, &c., during the travelling of trains	3	9	—	1	—	—	3	10
Whilst attending to, or by the failure of machinery, &c. of engines in steam	1	11	—	—	—	—	1	11
Whilst working on the permanent-way, sidings, &c.	18	38	4	4	—	—	22	42
Whilst attending to gates at level-crossings	1	1	—	—	—	—	1	1
Whilst walking, crossing, or standing on the line on duty	31	40	8	6	—	—	39	46
From being caught between vehicles	4	20	2	3	—	—	6	23
From falling or being caught between trains and platforms, walls, &c.	6	21	1	—	1	—	3	21
Whilst walking, &c., along the line on the way home or to work	1	9	1	1	3	1	5	11
Miscellaneous	2	6	—	—	—	—	2	6
TOTAL	80	393	21	66	4	2	105	461
OTHER PERSONS :—								
Whilst passing over railways at level crossings	16	6	—	—	—	2	16	8
Trespassers	47	16	15	3	6	1	68	20
Suicides	4	—	1	—	1	—	6	—
Miscellaneous	4	9	—	3	—	1	4	13
TOTAL	71	31	16	6	7	4	94	41
SUMMARY :—								
Passengers	17	203	3	9	—	—	20	213
Servants	80	393	21	66	4	2	105	461
Other persons	71	31	16	6	7	4	94	41
TOTAL ALL CLASSES	168	627	40	81	11	6	219	714

TABLE No. 3.

ACCIDENTS to TRAINS, ROLLING STOCK, PERMANENT WAY, &c., reported, during the Months of January, February, and March 1879, as having occurred on the RAILWAYS in the UNITED KINGDOM, distinguishing the different Classes of Accident, and the Number of Passengers and others, and of Servants of Railway Companies, KILLED or INJURED in each Class of Accident.

—	NUMBER OF CASES.				NUMBER OF PASSENGERS AND OTHERS.								NUMBER OF SERVANTS.							
	Eng-land and Wales.	Scot-land.	Ire-land.	United Kingdom.	England and Wales.		Scotland.		Ireland.		United Kingdom.		England and Wales.		Scotland.		Ireland.		United Kingdom.	
					Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.
Collisions between passenger trains or parts of passenger trains - - -	8	-	-	8	-	18	-	-	-	-	-	18	-	1	-	-	-	-	-	1
Collisions between passenger trains and goods or mineral trains, engines, and vehicles standing foul of the line -	17	5	1	23	-	62	-	7	-	-	-	69	-	9	-	4	-	-	-	18
Collisions between goods trains or parts of goods trains -	8	2	-	10	-	-	-	-	-	-	-	-	-	9	-	3	-	-	-	12
Trains coming in contact with projections from other trains travelling on parallel lines -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Passenger trains or parts of passenger trains leaving the rails - - -	11	9	2	22	-	4	-	-	-	-	-	4	-	-	-	-	-	-	-	-
Goods trains or parts of goods trains, engines, &c. leaving the rails - - -	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trains or engines travelling in the wrong direction through points - - -	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trains running into stations or sidings at too high a speed - - -	2	-	-	2	-	5	-	-	-	-	-	5	-	-	-	-	-	-	-	-
Trains running over cattle or other obstructions on the line	20	3	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trains running through gates at level-crossings - -	18	1	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The bursting of boilers or tubes, &c. of engines -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The failure of machinery, springs, &c. of engines -	3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The failure of tyres - -	293	31	3	327	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
„ „ wheels - - -	11	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
„ „ axles - - -	67	28	3	98	-	1	-	1	-	-	-	2	-	-	-	-	-	-	-	-
„ „ break apparatus -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
„ „ couplings - - -	2	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
„ „ ropes used in working inclines -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
„ „ tunnels, bridges, viaducts, culverts, &c. -	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Broken rails - - -	191	995	1	1,187	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
The flooding of portions of permanent-way - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Slips in cuttings or embankments - - -	6	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire in trains - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire at stations, or involving injury to bridges or viaducts -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other accidents - - -	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL - - -	-	-	-	-	-	90	-	8	-	-	-	98	-	21	-	7	-	-	-	28

TABLE No. 4.

ACCIDENTS to TRAINS, ROLLING STOCK, PERMANENT WAY, &c. on the RAILWAYS in the UNITED KINGDOM, reported
RAILWAYS on which the same have occurred, and the Number of Passengers and others, and

NAME OF COMPANY.	Col- lisions between pas- senger trains or parts of pas- senger trains.	Col- lisions between pas- senger trains, and goods or mineral trains, engines, &c.	Col- lisions between goods trains or parts of goods trains.	Trains coming in contact with pro- jections from other trains travel- ling on parallel lines.	Pas- senger trains or parts of pas- senger trains leaving the rails.	Goods trains or parts of goods trains, engines, &c. leaving the rails.	Trains or engines travel- ling in the wrong direction through points.	Trains running into stations or sidings at too high a speed.	Trains running over cattle or other obstruc- tions on the line.	Trains running through gates at level- cross- ings.	The bursting of boilers or tubes, &c. of engines.	The failure of ma- chinery, springs, &c. of engines.	The failure of tyres.
ENGLAND AND WALES.													
Aylesbury and Buckingham	-	-	-	-	1	-	-	-	-	-	-	-	-
Brecon and Merthyr Tydfil Junction	-	-	-	-	-	2	-	-	-	-	-	-	-
Cambrian	-	-	-	-	-	-	-	-	-	-	-	1	-
Cheshire Lines	-	-	-	-	-	-	-	-	-	-	-	1	-
Cornwall	-	-	-	-	-	-	-	-	-	-	-	-	2
Festiniog	-	-	-	-	-	-	-	-	-	-	-	-	-
Furness	1	-	-	-	-	-	-	-	-	-	-	-	6
Great Eastern	1	1	1	-	-	-	-	-	3	13	-	-	3
Great Northern	-	-	-	-	-	-	-	-	-	-	-	-	1
Great Western	-	1	1	-	1	-	-	-	2	3	-	-	21
Lancashire and Yorkshire	1	-	3	-	3	-	-	-	2	1	-	-	3
Lancashire and Yorkshire and Lancashire Union Joint	-	1	-	-	-	-	-	-	-	-	-	-	-
London and North-Western	-	9	-	-	1	-	-	1	1	-	-	-	28
London and South-Western	-	1	-	-	-	-	-	1	-	-	-	-	-
London, Brighton, and South Coast	-	1*	1	-	1	-	-	-	-	-	-	-	-
London, Chatham, and Dover	1	-	-	-	1	-	-	-	-	-	-	-	1
Macclesfield Committee	-	-	-	-	1	-	-	-	-	-	-	-	-
Manchester, Sheffield and Lincolnshire	-	-	-	-	-	-	-	-	-	-	-	-	3
Manchester, South Junction, and Altrincham	-	-	-	-	1	-	-	-	-	-	-	-	-
Maryport and Carlisle	-	-	-	-	-	-	-	-	-	-	-	-	1
Metropolitan	-	1	-	-	-	-	-	-	-	-	-	-	-
Metropolitan District	-	-	-	-	-	-	-	-	-	-	-	-	-
Midland	1	-	-	-	-	-	-	-	-	-	-	1	4
Monmouthshire	-	-	1	-	-	-	-	-	5	1	-	-	-
North-Eastern	1	1	-	-	-	-	-	-	6	-	-	-	2
North London	1	-	-	-	-	-	-	-	-	-	-	-	-
North Staffordshire	-	-	-	-	-	-	-	-	-	-	-	-	10
North Union	1	-	-	-	-	-	-	-	-	-	-	-	-
Potteries, Shrewsbury, and North Wales	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhymney	-	1	1	-	-	-	-	-	-	-	-	-	-
Severn and Wye Railway and Canal	-	-	-	-	-	-	-	-	1	-	-	-	-
South-Eastern	-	-*	-	-	1	-	-	-	-	-	-	-	1
Private Owners	-	-	-	-	-	-	-	-	-	-	-	-	207
TOTAL ENGLAND AND WALES	8	17	8	-	11	2	-	2	20	18	1	8	293

* These passengers and five servants were injured in a collision between a passenger train and a pilot-engine, both belonging to the South-Eastern

Rolling Stock, Permanent Way, &c.—*continued.*

The failure of wheels.	The failure of axles.	The failure of break apparatus.	The failure of couplings.	The failure of ropes used in working inclines.	The failure of tunnels, bridges, viaducts, or culverts.	Broken rails.	The flooding of portions of permanent way.	Slips in cuttings or embankments.	Fire in trains.	Fire at stations, or involving injury to bridges or viaducts.	Other accidents.	Number of Passengers and others.		Number of Servants.		Total all Classes.	
												Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	15	-	-	-	-	123	-	-	-	-	-	-	1	-	3	-	4
-	5	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	3	-	-	-	1	867	-	-	-	-	-	-	7	-	4	-	11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	28	-	-	-	1	995	-	-	-	-	-	-	8	-	7	-	15
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	3	-	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-
11	98	-	4	-	1	1,187	-	6	-	-	1	-	98	-	28	-	126

TABLE No. 5.—Number of Servants reported

NAME OF COMPANY.	From accidents to trains, &c. See Table No. 4.		Whilst coupling or uncoupling vehicles.		By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines.		Whilst passing over, or standing upon buffers during shunting.		When getting on or off, or falling off, engines, waggons, &c. during shunting.		Whilst breaking, spragging, or chocking wheels.		Whilst attending to ground-points, marshalling trains, &c.		Whilst moving vehicles by capstans, turn-tables, props, &c. during shunting.		By other accidents during shunting operations not included in the preceding.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
SCOTLAND.																		
Caledonian - - - - -	-	3	-	7	-	-	-	-	-	4	-	-	-	2	-	-	-	1
Dundee (East) Joint Station - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Glasgow and Paisley Joint - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Glasgow and South-Western - -	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
North British - - - - -	-	4	1	2	-	-	-	4	1	13	-	2	1	-	-	1	-	2
Sutherland's, Duke of - - - - -	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL, SCOTLAND - - - - -	-	7	2	9	-	-	-	4	1	19	-	2	1	2	-	1	1	4
IRELAND.																		
Belfast and Northern Counties - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Great Southern and Western - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Midland Great Western - - - - -	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Waterford and Limerick - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL, IRELAND - - - - -	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
TOTAL, UNITED KINGDOM - - - - -	-	28	5	76	1	10	-	14	3	60	1	18	1	10	1	26	3	41

as Killed or Injured, &c.—continued.

From falling off engines, &c., during the travelling of trains.		By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains.		When getting on or off engines, vans, &c., during the travelling of trains.		Whilst attending to, or by the failure of, machinery, &c., of engines in steam.		Whilst working on the permanent way, sidings, &c.		Whilst attending to gates at level crossings.		Whilst walking, crossing, or standing on the line on duty.		From being caught between vehicles.		From falling or being caught between trains and platforms, walls, &c.		Whilst walking, &c., on the line on the way home or to work.		Miscellaneous.		TOTAL.	
Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	1	-	1	-	-	1	2	-	-	5	8	-	1	-	-	1	1	-	-	7	26
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	1	2
-	1	-	-	-	-	-	-	1	-	-	-	1	2	-	1	-	-	-	-	-	-	2	6
-	-	-	1	-	-	-	-	1	2	-	-	2	1	2	-	1	-	-	-	-	-	9	32
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
-	1	-	2	-	1	-	-	4	4	-	-	8	6	2	3	1	-	1	1	-	-	21	66
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	1	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3	1	-	-	4	2
2	2	1	5	3	10	1	11	22	42	1	1	39	46	6	23	8	21	5	11	2	6	105	461

TABLE No. 6.

TABLE showing the different OCCUPATIONS of SERVANTS of RAILWAY COMPANIES and CONTRACTORS who were KILLED and INJURED during the Months of January, February, and March 1879, and classifying their INJURIES as far as practicable.

CLASS OF SERVICE.	Fatal.	Amputations.			Fractures.		Dis- locations.	Crushes.			Scalds.	Sprains, Cuts, or Bruises.	Severe.	Shaken.	Slight.	Unspecified Injuries to				Mis- cella- neous	Total In- jured.
		Legs or Arms.	Feet or Hands.	Toes or Fingers.	Legs or Arms.	Collar- bones or Ribs.		Legs or Arms.	Feet or Hands.	Body.						Head.	Body.	Legs or Arms.	Feet or Hands.		
Breaksmen and Goods-guards	15	2	1	-	5	1	-	4	15	4	-	37	3	7	4	2	5	7	6	-	108
Capstanmen	-	-	-	1	-	-	-	-	1	-	-	2	-	1	-	1	1	-	-	-	7
Carmen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carriage-cleaners	-	1	-	-	-	1	-	-	-	-	-	-	-	-	1	-	1	-	-	-	4
Carriage or Wag- gon examiners	-	-	-	-	1	-	-	-	1	-	-	1	1	-	-	1	2	-	-	-	7
Checkers	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chockers, Chain- boys, and Slip- pers	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3	-	5
Clerks	2	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	2
Engine-cleaners	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	-	1	-	4
Engine-drivers	2	1	-	-	2	-	-	-	-	1	-	6	2	2	2	2	-	1	2	-	21
Firemen	1	-	-	-	2	-	-	2	2	-	1	6	2	2	2	4	1	-	3	1	28
Gatekeepers	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Greasers	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	3
Guards, Pas- senger	2	-	-	-	-	1	-	-	-	-	-	3	1	1	1	1	-	-	-	-	8
Horse-drivers	2	-	-	-	-	-	-	-	4	3	-	1	-	-	-	-	-	-	1	-	9
Inspectors	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	3
Labourers	6	1	-	-	1	-	-	-	-	-	-	3	2	-	1	1	-	-	-	-	9
Lampmen	1	-	-	-	-	-	1	-	2	-	-	-	-	1	-	-	-	-	-	-	4
Loaders and Sheeters	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	2
Mechanics	6	1	-	-	2	-	-	-	-	-	-	1	-	-	-	1	1	-	-	-	6
Messengers	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
Number-takers	1	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	1	-	-	-	5
Permanent - way Men	28	1	1	1	3	2	-	3	1	-	-	21	1	4	3	3	6	3	-	-	53
Pointsmen	2	-	-	-	1	-	-	-	1	-	-	2	-	1	1	-	-	-	-	-	6
Policemen	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Porters	11	1	-	1	7	2	1	5	16	5	-	17	1	1	3	2	1	3	7	-	73
Shunters	11	-	2	1	2	1	1	7	8	1	-	17	-	1	2	2	5	4	8	-	62
Signal-fitters	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Signalmen	1	1	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	3
Station Masters	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3
Ticket-collectors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Watchmen	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Yardsmen	2	-	-	-	-	-	-	1	-	-	-	8	-	-	-	-	2	-	-	-	11
Miscellaneous	6	-	-	1	-	-	-	-	2	-	-	1	1	1	1	-	1	1	-	-	9
Contractors' Ser- vants.	2	-	-	-	-	-	-	-	1	1	-	2	-	-	2	-	-	-	-	-	6
TOTAL	105	10	4	6	29	10	3	22	58	16	1	136	15	24	23	22	29	20	32	1	461

TABLE No. 7.

NUMBER of PERSONS reported during the Months of January, February, and March 1879, as having been KILLED or INJURED, whilst upon the Companies' Premises, by Accidents in which the Movement of Vehicles used exclusively upon Railways was not concerned, distinguishing between Passengers, Servants of Companies, and other Persons, and classifying, as far as practicable, the Nature and Causes of the Accidents occasioning the Death or Injury.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
Whilst ascending or descending steps at stations - - - -	—	18	—	—	—	—	—	18
By being struck by barrows, by falling over packages, &c. on station platforms -	—	8	—	—	—	—	—	8
From falling off platforms - - -	—	6	—	—	—	—	—	6
By other accidents - - -	1	10	—	—	—	—	1	10
TOTAL - - -	1	42	—	—	—	—	1	42
SERVANTS :—								
Whilst loading, unloading, or sheeting waggons - - - -	—	96	—	5	—	—	—	101
Whilst moving or carrying goods in warehouses, &c. - - -	—	28	—	—	—	—	—	28
Whilst working at cranes or capstans -	3	30	—	4	—	—	3	34
By the falling of waggon-doors, lamps, bales of goods, &c. - - -	1	20	—	1	—	—	1	21
From falling off, or when getting on or off, stationary engines or vehicles -	—	72	—	6	—	—	—	78
From falling off platforms, ladders, scaffolds, &c. - - -	1	39	—	—	—	—	1	39
By stumbling whilst walking on the line or platforms - - -	1	31	—	1	—	—	1	32
Whilst attending to stationary engines in sheds - - - -	—	17	—	—	—	—	—	17
By being trampled on or kicked by horses	—	5	—	—	—	1	—	6
Whilst working on the line or in sidings	3	39	—	—	—	—	3	39
Miscellaneous - - - -	—	26	—	—	—	—	—	26
TOTAL - - -	9	408	—	17	—	1	9	421
PERSONS ON BUSINESS AT STATIONS -	1	17	—	—	—	1	1	19
SUMMARY :—								
Passengers - - - -	1	42	—	—	—	—	1	42
Servants - - - -	9	408	—	17	—	1	9	421
Persons on business at stations - -	1	17	—	—	—	1	1	18
TOTAL ALL CLASSES -	11	462	—	17	—	2	11	481

REPORTS TO THE BOARD OF TRADE BY INSPECTING OFFICERS OF THE RAILWAY DEPARTMENT UPON CERTAIN ACCIDENTS WHICH HAVE BEEN INQUIRED INTO.

	Page		Page
CALMDONIAN :		MACCLESFIELD COMMITTEE :	
Major Marindin's report on an accident that occurred on 4th March, between Strathyre and Lochearnhead, to a mixed passenger and goods train, part of which left the rails - - -	22	Major Marindin's report on an accident that occurred on 11th March, at Marple Wharf junction, to a passenger train which left the rails - - -	73
GREAT EASTERN :		METROPOLITAN AND GREAT WESTERN RAILWAY :	
Major-General Hutchinson's report on a collision that occurred on 13th January, between a fast goods train and a passenger train, which was standing at Wymondham station - - -	25	Colonel Yolland's report on a fatal accident that occurred on 15th January, at Westbourne Park station, to a female passenger - - -	76
Major-General Hutchinson's report on a collision that occurred on 31st January, at Stepney junction station, between two passenger trains - - -	28	METROPOLITAN :	
GREAT NORTHERN :		Colonel Yolland's report upon a collision that occurred on 7th February, in the tunnel between King's Cross and Farringdon Street, between a passenger train and a goods train - - -	77
Colonel Yolland's report on an accident that occurred on 14th February, near Bawtry station, to the (Flying Scotchman) up express passenger train, from the fracture of an axle under the leading carriage - - -	30	METROPOLITAN DISTRICT :	
HIGHLAND :		Colonel Yolland's report on an accident that occurred to a passenger train on 9th January, between Blackfriars and Temple stations - - -	82
Major Marindin's report on an accident that occurred on 24th February, between Newtonmore and Dalwhinnie, to an up mail train which left the rails - - -	37	MIDLAND :	
LANCASHIRE AND YORKSHIRE :		Major-General Hutchinson's report on a collision that occurred on 16th January, at Bradford station, between a passenger train and an empty train - - -	84
Major Marindin's report on an accident that occurred on 2nd January, at Accrington, to a passenger train, the rear vehicle of which left the rails - - -	41	MONMOUTHSHIRE :	
Major Marindin's report on two accidents that occurred on 16th January, at Victoria station, Manchester, from the last two carriages in a passenger train, which was moving by gravitation, and from the engine of a passenger train, leaving the rails - - -	43	Colonel Rich's report on a collision that occurred on 4th January, at Newport, between a London and North-Western Railway Company's goods train and a Monmouthshire Railway Company's goods train - - -	87
LANCASHIRE AND YORKSHIRE AND LANCASHIRE UNION JOINT :		NORTH BRITISH :	
Major Marindin's report on a collision that occurred on 27th January, at Feniscowles station, between a special goods train and a passenger train - - -	46	Major-General Hutchinson's report on a collision that occurred on 25th January, between Garagaber junction and Avenue Head, between two mineral trains - - -	90
LEEDS JOINT STATION :		Major Marindin's report on a collision that occurred on 3rd March, at Riccarton junction, between a passenger train and a goods train - - -	93
Major-General Hutchinson's report on a collision that occurred on 5th January, between a North-Eastern passenger train and some London and North-Western empty carriages - - -	49	NORTH LONDON :	
LONDON AND NORTH-WESTERN :		Major Marindin's report on a collision that occurred on 3rd January, at Shoreditch, between a passenger train and a train of empty carriages - - -	96
Major Marindin's report on a collision that occurred on 10th January, at New Street station, Birmingham, between a passenger train and a light engine - - -	51	RHYMNEY :	
Colonel Rich's report on a collision that occurred on 24th January, at the Shropshire Union junction, between a mail train and a light engine - - -	53	Colonel Rich's report on a collision that occurred on 22nd January, at the south side of Cardiff station, between a runaway mineral train and a stationary mineral train - - -	99
Major Marindin's report on a collision that occurred on 6th February, at Ordsall Lane, near Manchester, between a passenger train and a train of empty waggons - - -	55	Colonel Rich's report on a collision that occurred on 24th January, at Cardiff station, between a London and North-Western Railway Company's goods train and a Rhymney Railway Company's passenger train - - -	103
LONDON, BRIGHTON, AND SOUTH COAST :		SOUTH-EASTERN :	
Colonel Yolland's report on a collision that occurred on 27th February, at the Forest Hill station, between a passenger train and a pilot-engine, both belonging to the South-Eastern Railway Company - - -	57	Colonel Yolland's report on an accident that occurred on 24th January, at Cannon Street station, to a passenger train, two carriages in which were pulled off the rails - - -	106
LONDON, CHATHAM, AND DOVER :		Major-General Hutchinson's report on an accident that occurred on 10th March, at Deptford station, to a passenger in alighting from a passenger train which had over-ran the platform - - -	108
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CALEDONIAN RAILWAY.

SIR, Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 8th April 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 6th ultimo, the result of my inquiry into the causes of an accident which occurred on the 4th ultimo, between Strathyre and Lochearnhead, on the Caledonian Railway.

In this case, as the 10.45 p.m. mixed passenger and goods train from Stirling to Dalmally, consisting of two engines and tenders, 19 goods waggons, of which all but four were loaded, goods break-van, composite carriage, and third-class carriage with break-compartment, was approaching Kingshouse station at about 1.15 a.m. on the 4th ultimo, the 17 rear vehicles in the train, including the two passenger carriages, left the rails.

There was only one passenger in the train and he was slightly hurt. None of the servants of the Company were injured.

The two leading goods waggons which had left the rails, the seventh and eighth from the engine, had their wheels, springs, axle-boxes, and horn-plates out, and the waggon immediately in front of the goods break-van had also lost its wheels and had one axle broken.

These three vehicles, the goods break-van, a covered van, and a cattle truck which was upset, were considerably damaged, and three other waggons were slightly damaged.

The passenger carriages were partly upset against the bank, the composite carriage being much damaged.

The draw-bar and front couplings of the 10th and 15th waggons, and both couplings of the goods break-van, were broken.

The road was completely torn up on the right-hand side for a distance of about 300 yards, and on the left-hand side the rails were out for about 40 yards, and a number of chairs were marked and chipped.

No rails were broken, but several were bent, and 300 chairs and 10 sleepers had to be replaced.

Description.

The line from Dunblane to Callander and Dalmally, upon which this accident happened, has a single line of rails only.

It is straight for some distance up to a point about 140 yards before arriving at the spot where the first traces of any vehicle having left the rails were found, is then on a 40-chain curve to the right for about 400 yards, and then straight past Kingshouse station. The gradient is one of 1 in 60 rising towards Kingshouse.

The permanent-way consists of 75lb. iron rails, in 24 feet lengths, fixed in 28lb. chairs, on half-round larch sleepers 9' x 10" x 5", with two spikes to each chair. The keys are of oak, and the fish-plates are 18 inches in length.

Evidence.

James Inglis, goods guard 18 months, states: On the 3rd inst. I was guard of the 10.45 p.m. mixed train from Stirling to Dalmally. We left Stirling at 11 p.m., quarter of an hour late, with train consisting of two engines and tenders, 19 waggons, all loaded except four, goods break-van in which I was riding, one composite, and third-class break. We arrived at Callander at 11.56 p.m., took on one waggon, and left at 12.36, 48 minutes late. At Strathyre we put off one waggon, and left at 1.6 a.m., 44 minutes late. Everything went all right until we were approaching Kingshouse, when I felt the van swinging violently, and I was knocked over before I could get to the break, which was almost immediately thrown over on its side. I was not hurt, and got out at once, and found that the whole of the train was off the rails, except the six leading waggons, which remained attached to the engine, and had run ahead over 300

yards. The train was divided into three portions. The engine and nine waggons in front, the rear three off the rails, then an interval of about 160 yards, then five waggons all off the rails, then an interval of about 32 yards, and then the remainder of the train all off the rails. Nearly all were off to the right, all except my van and two waggons. My van and a cattle waggon were the only vehicles upset, and the two passenger carriages partially so. We were running about 20 miles an hour when the accident happened. I had felt nothing whatever wrong with the road before the accident happened. I went back and examined the ground as well as I could in the dark. I found no obstruction on the rails, and no marks of anything being off above five or six yards behind the rear carriage. The train was double-coupled throughout, and side chains on all vehicles which had them. The draw-bars were broken between the different

portions of the train and pulled out. The wheels were out from the 7th waggon and 8th waggon, and also from the waggon of stones next to my van. The road was torn away right up to Kingshouse. I heard a whistle from the engine after the accident occurred. My van is a 12 ton 10 cwt. van.

Alexander Smith, inspector, states: I was acting as guard to the passenger portion of the 10.45 p.m. mixed train from Stirling to Dalmally on the 3rd instant. I was riding in the break-compartment of the rear carriage. On approaching Kingshouse I felt the carriage give two violent swings, first to the left and then back, which threw me against the rear of the carriage. It upset almost immediately on the right-hand side. I was not hurt, and got out at once, and found the composite-carriage upset on the right-hand side of the line, and lying against the end of the stone truck, the goods-van being pitched out on the left and upset, and the remainder of the train as described by Inglis. We were running about 20 miles an hour. I felt no jerk at all before the swinging of my carriage. The road seemed to be running smoothly and well. I did not go to examine it afterwards. The accident happened at 1.15 by my watch. We left Strathyre at 1.6 by my watch. The carriages were not quite upset, but pitched up on their ends and half over. There was only one passenger and he was very slightly hurt. Inspector McDonald was in my van.

Alexander McDonald, permanent-way inspector, states: I have charge of the line from Dunblane to Dalmally. I had been over the line at the site of the accident about a week before, and had tried the gauge all along. Everything was in good order. On the night of the accident I was riding in the rear break-compartment. I felt nothing wrong till the carriage gave two violent oscillations, and almost immediately pitched over on its fore-end and side. I was not hurt, and got out at once and found the train as described by Inglis. I immediately went back and examined the road. It was all right up to within a rail length of the rear of the van where the whole road was slewed two or three inches to the left. This was just newly done. From this point up to Kingshouse every rail was thrown out. No rails were broken. Nearly 300 chairs were broken, and more chipped; a number of the sleepers were split and broken. I examined the place when it got light. There were marks of wheels running over the sleepers and tops of chairs on both sides, but not many wheel marks I should say, and those were principally on the left. The road has not been touched this side of the accident since. No keys have been put on since. There were none out before the accident. It was the right-hand rail which was knocked out all the way to Kingshouse; the left rail was not out for the whole distance, only for about 40 yards. William McGregor, foreman platelayer, in charge of that length, told me that he had walked the road at 5 p.m., and that it was all right.

George Moultrie, goods driver two months, and fireman eight years, states: On the 3rd inst. I was driving the train engine of the 10.45 p.m. train from Stirling to Dalmally. We left Strathyre 44 minutes late, at 1.6 a.m., and were running from 18 to 20 miles an hour on approaching Kingshouse. When about 100 yards short of the platform, I felt a sudden jerk behind, and my head was thrown forward, almost through the window. I looked back and saw the fire flying from the wheels of the waggons; I should think about eight or nine waggons back. I whistled to the pilot driver to shut off steam, and told my mate to put on the tender-break. He did so. I had shut off steam at once. I didn't reverse. I ran about 150 yards before stopping. I got out to see what was wrong. I found the train divided into three portions, and lying in the positions described by Inglis in his evidence. I didn't go back to look at the road behind the train. I hadn't observed

anything wrong with the road. Of course, with the long frost and thaw, it has not been running quite as well as in fine weather. My engine is a 6-wheel coupled engine and 4-wheeled tender, with break on tender. One block to each wheel. I didn't myself see any broken axle. I felt only one jerk, and nothing more. It was a very wet, nasty night, and the rails were very slippery. The accident happened at 1.15. I am certain I was not running fast.

Donald Beaton, fireman about three months, has nothing to add to his driver's evidence.

Henry Brown, pilot driver, states: On the 3rd inst. I was driver of the pilot engine of the 10.45 p.m. train from Stirling to Dalmally. We were running about 18 miles an hour when approaching Kingshouse. I didn't know that anything was wrong till the driver of the train whistled to me. I felt no jerk. We pulled up in 150 yards, or a little over.

Angus Burns, fireman, has nothing to add to the driver's evidence, and felt no jerk.

James Hamilton, locomotive foreman: I was at Luib on the night of the accident, and was sent for at about 4 in the morning. I got there at about 7 a.m. I found that 13 waggons, the goods break-van, and the two passenger carriages, were off the rails. The only wheels still on the rails were the leading wheels of the 10th waggon, which was the front one in the second group. The nine leading waggons had remained attached to the engine, but the seventh, eighth, and ninth were off the rails, and the seventh and eighth had lost wheels, axle-boxes, and springs. The draw-bar of No. 10 waggon had broken and remained attached to No. 9. There was an interval of about 160 yards between these two waggons. No. 10 and the four next waggons were coupled together all off the rails. There was then an interval of about 30 yards. No. 15, a cattle truck, was upset on the right-hand side, Nos. 16, 17, and 18, off the road on the right, and No. 19 on the road without wheels. The guard's van was upset on the left-hand side opposite to No. 19 waggon. The two carriages were off to the right and half-turned over. The road was twisted about 60 yards back from the rear of the train in the shape of an S. I should think it was seven or eight inches out of place. I did not measure the distance, nor did I count the number of rails displaced. I did not measure how much they were out of place. One axle only in the train was broken, and that was one of the axles of the waggon loaded with stones just in front of the guard's van. That was broken about eight inches inside the boss of the wheels. The axle and wheels were lying in the 4-foot way, end on, and I cannot say which side was broken. The other pair of wheels belonging to this waggon were lying just behind it. Axle-boxes, horn-plates, and springs were carried away. It was an iron axle, but I did not know its dimensions. I examined the fracture. It is a new break right through. There is no flaw whatever. The iron was of a medium quality. The other two waggons without wheels, the seventh and eighth from the front, had lost horn-plates, axle-boxes, and springs. I do not know where these were found.

Mr. Proudfoot, superintendent of permanent-way, states: I was at the site of the accident at about 10 a.m. I found the waggons as described by the other witnesses. The road behind the rear of the train was quite right when I saw it, and I tried the gauge, which was, as it should be, about quarter of an inch slack. Soon afterwards Mr. Hamilton told me the road had been twisted. We went together to examine it, and found the holes where the pinch bars had been put in to shift it straight, at three joints in rear of the train. The third joint hadn't been moved much, but the centre joint had been shifted perhaps seven inches; the one next to the train not so much again.

Conclusion.

From the foregoing evidence it appears that this train was running at a speed of about 20 miles an hour up an incline of 1 in 60, and on a 40-chain curve to the right, about 100 yards short of Kingshouse station, when the driver of the train engine felt a violent jerk, and then perceived that one or more of the vehicles in the train had left the rails.

The train was stopped in about 160 yards, and it was then found in the following position: The engines, tenders, and six leading waggons on the rails; the seventh, eighth, and ninth waggons still attached, but off the rails, the seventh and eighth being without springs, axle-boxes, or wheels; then, after an interval of about 160 yards, five more waggons, Nos. 10, 11, 12, 13, and 14 off the rails; then after another interval of 32 yards No. 15 waggon, a cattle waggon, upset, Nos. 16, 17, and 18 upright, but off the rails, No. 19 on the road without springs, axle-boxes, or wheels, and with the axle broken, the goods break-van upset at one side of the road opposite to the rear waggon, and the two rear vehicles of the train (passenger carriages) off the rails, partly turned over against the bank.

The whole of these vehicles were off to the right or towards the inside of the curve, except Nos. 9 and 14 waggons and the goods break-van.

There were no marks whatever of any vehicle running off the rails behind the rear portion of the train, but the whole of the rails on the right-hand side, and about 40 yards of rails on the left-hand side, were torn up from this point to the place where the seventh waggon was found, a distance of 300 yards.

Behind the rear of the train both rails were slewed to the left for three rails' lengths, the gauge being maintained correct, but this was evidently caused by the violent displacement of the rails under the rear portion of the train, after it had left the rails, the joints having held fast, and the ballast being rather rotten from the effect of long continued frost and subsequent thaw.

The road up to this point was in good condition, the gauge and cant being correct and even, and there does not appear to have been any obstruction on the rails.

It is evident that this accident was caused by the break-down of one of the goods waggons, but it is impossible to be certain which of them first left the rails.

The axle belonging to the rear waggon, which was the only fractured axle in the train, was clearly broken by the accident, for it had been bent nearly six inches out of the straight before giving way; and it is probable that either the seventh or eighth waggons, both of which were found without their wheels, first left the rails about the point where the rear of the train stopped, and then tore up the road in the manner described.

There were marks on the sleepers as if a pair of wheels had been dragged for a considerable distance under one of the waggons with the axle diagonally across the road, and it is very possible that the springs of one of these waggons having given way, one pair of wheels may have got out of place and disturbed the road by being dragged along over the sleepers, and that the remaining vehicles then left the road in succession, causing further damage to the road.

The darkness of the night probably prevented the driver from perceiving what had happened until he felt a jerk, which was evidently caused by the parting of the couplings between Nos. 9 and 10 waggons. The couplings between Nos. 14 and 15 waggons may have parted at about the same time or immediately afterwards, and the five waggons found in the second group have run on for the distance of 30 yards further than the rear portion of the train, which seems to have stopped very suddenly.

I could not ascertain the mileage run by the waggons which lost their wheels, but they are stated to have been in good condition and not more than seven years old, and to have been examined before being attached to the train.

This accident is one of a not uncommon description, arising from the practice so often condemned, of running mixed trains with the goods waggons in front of the passenger carriages, whereby passengers are exposed to the risk of a run-off due to the breaking down of vehicles of an inferior class to that which is considered to be necessary for passenger traffic.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major, R.E.

Printed copies of the above Report were sent to the Company.

GREAT EASTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., 7th February 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 1st instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 13th ultimo at Wymondham station on the Great Eastern Railway.

In this case, while the 7.50 p.m. up passenger train (consisting of engine, tender, three coaches, guards' van, and empty carriage) from Norwich to Wells was standing at Wymondham up platform, it was run into by the 8.15 p.m. up fast goods train (consisting of engine, tender, 17 loaded waggons, and a break van) from Norwich to London, due also to stop at Wymondham. Just as the collision occurred the 5.10 p.m. down express passenger train from London to Norwich was starting from the Wymondham down platform, and a portion of the empty carriage at the rear of the Wells train (which was broken up) came into collision with the sides of three of the carriages in the down express train.

One passenger in the Wells train, two in the down express train, and one on the platform have complained of injury.

In the Wells train the empty carriage at the rear was more or less destroyed, and the end of the break-van stove in. In the down express train the sides of three carriages were damaged. In the goods train one of the cross stays between the bogie frames of the engine was broken. The bogie wheels were all knocked off the rails.

Description.

Wymondham junction station has been recently remodelled, the signal arrangements being carried on in two cabins, one at the north end of the station, and the other at the south end, where the Wells branch joins the main line. As regards the north cabin, to which it is alone here necessary to refer, it is provided with an up distant, an up home-signal, and an up signal at the north end of the up platform, all which can be well seen in clear weather. The up home-signal is 100 yards north of the cabin, and the up distant-signal 800 yards north of the up home-signal. The signal at the north end of the up platform is 160 yards south of the cabin, or 260 yards south of the up home-signal. The Wells train was standing with its rear carriage 40 yards south of this latter signal, or 300 yards inside the up home-signal, when the goods train ran into it. The line falls from the north towards Wymondham for a considerable distance, on a gradient of 1 in 184, to a point about 40 yards north of the up home-signal, whence, through the station, it changes to gradients, still falling, of 1 in 308 and 1 in 418. The traffic is worked on the absolute block system, the next block station to the north being Hethersett, distant four miles. In clear weather the signalman is permitted by the rules to give "line clear" to Hethersett when the tail of a train has passed his cabin, *i.e.*, when it is 100 yards inside the up home-signal, and in foggy weather when it has passed the signal at the north end of the up platform, *i.e.*, when it is 260 yards inside the up home signal.

Evidence.

1. *William Saunders*, signalman two and three quarter years, nine months in Wymondham north cabin.—I came on duty at 6 p.m. for 12 hours on the 13th ult. Hethersett cabin is the next station north, distant four miles, between which and my cabin the block system is worked, and also between my cabin and Wymondham south cabin. The evening was foggy; at the time of the collision I could see the signal at the down end of the platform, and also the tail lights of the train for Wells. There were fog signalmen both at my up home and up distant-signals. They were there when I came on duty. The train for Wells, due at 8.15, passed the cabin at 8.17 p.m. with clear signals. At 8.39 p.m. I got the goods train "on line" from Hethersett, when it was passing that station. I did not take my signals off for it, because the Wells train was still in the station. This goods train generally comes in with clear signals, the Wells train having usually started. The rule is to

give "line clear" to Hethersett when a train is standing at the Wymondham up platform. In foggy weather I should not give "line clear" until the tail of a train had passed the starting signal at the end of the up platform, and in clear weather when it passed the box. The goods train passed my cabin at 8.47, eight minutes after leaving Hethersett, the time from Hethersett generally being 12 minutes, but seldom less than 10 minutes. I saw first the train 40 or 50 yards north of the home-signal, where I heard only one fog signal explode, though I saw two flashes. At this time I could hear that the engine was reversed. The speed on passing the cabin was perhaps nine or ten miles an hour; there were no wheels skidding that I could see, but I observed the fireman and guard at their breaks. I could not see whether steam was on or not. The down starting-signal wire was broken at this time (it had been broken since 7.55 p.m.), and I was giving the down train from London (which was

just leaving the platform) a green hand-signal before the goods train passed, and I then turned a red light against the goods train, and after the goods train had passed I again gave the down train a green signal. The driver had started before the collision, which occurred at 8.47 p.m.

2. *John Kiddle*, platelayer, and acting as fog signalman on the evening of the 13th January.—I commenced fog-signalling at Wymondham up distant-signal about 5 p.m. I had laid down fog signals about 200 yards north of the distant-signal, and could see it about 100 yards off at the time the goods train passed. I do not remember whether there was a fog signal down for the passenger train for Wells. After it had passed I put down two fog signals, about 10 yards apart, on the 6-ft. rail, and I was standing about half way between them and the distant-signal post when the goods train ran over them. Only one exploded, the other merely hissed. One signifies danger. It struck me that the train was running faster than usual, about 20 miles an hour. Steam was shut off before the engine came to the fog signal. I saw no fire flying from the wheels. I heard the driver whistle twice—not the sharp break whistle—before he reached the fog signal, and when, I think, he must have first seen my red light. I could just see his head lights at the time. I did not think when he passed me that he would have overrun the home-signal. He whistled again after passing me, two or three times.

3. *Adam Tyrer*, goods driver four years, fireman six years, about nine months with the Great Eastern Company, and previously with the North British Company.—I have during the last nine months run about six times from Norwich to London, and frequently from Norwich to Wells. I consider myself well acquainted with the road. I left Thorpe goods station, Norwich, with 17 loaded trucks and a break-van, at about 8.17 p.m. on the 13th. My engine was a 4-coupled one with a 6-wheeled tender. The cylinders were, outside, 18 inches by 24 inches. There was a hand break on the engine for the coupled wheels, and the usual tender break, but the blocks were all worked with the same wheel. I had first to stop at Wymondham, and was not checked anywhere by signal on the journey. It was very foggy all the way along, I got clear signals at Hethersett. The usual place for shutting off steam for Wymondham is at Spink's Lane crossing, about one and a half miles off, and on this occasion I shut off steam sooner than usual because of the fog, the speed being at the time about 20 miles an hour. On approaching Wymondham up distant-signal I first ran over a fog signal, then saw the distant-signal at "danger," and then saw the fog signalman showing a *white* light in the 4 ft. of the down line as I passed him. He did not shout. Before I had run over the fog signal, perhaps 300 or 400 yards, my mate had put on his break of his own accord. After passing the distant-signal I found that the speed was not being reduced, and I therefore reversed my engine about half way between the distant and home signals, and applied back steam before I had got to the home-signal, or could see it. I also whistled for the breaks as soon as I saw the distant-signal at "danger," and continued doing so, but I do not think they were put on till near upon the home-signal. On coming near the home-signal, I ran over a fog signal, and then saw the home-signal at "danger," and also got a red light from the fog signalman, as also from the signalman in the cabin, as I passed it, at about 10 miles an hour. I applied sand to the two driving wheels after passing the distant-signal. We both of us remained on the engine up to the time of collision, when I think the speed was somewhat reduced. We were neither of us hurt. The engine was damaged, and the bogie wheels and driving wheels were off the rails. We came to a stand in about 10 yards after striking the train. I had fully intended to stop at the home-signal, but failed to do so, as my breaks could

not hold. The blocks are of iron, 10 in all. I had found them faulty the previous day on the down journey, and had reported them in the book of repairs at Norwich as wanting shifting, but I do not know whether they had been examined. I did not look at them before starting on the up journey. It was an oversight of mine not to have done so during the journey. I had not had occasion to use them until approaching Wymondham. I could have pulled up the train in 300 yards had the break been in good working order.

Kiddle, recalled, adheres to the statement of his showing a red light.

4. *William Housego*, fireman nine years, about four or five months with Tyrer.—I had been with him on the down journey the previous day. We had found the breaks not working properly, and Tyrer said that he should report it. I asked him, before starting on the up journey, whether he had done so, and he said he had; but I did not examine the breaks myself. We had no check after leaving Norwich, and were running at the usual speed. Steam was shut off about the usual place at Spink's crossing, the speed being about 20 miles an hour. Shortly after this I applied the break sooner than usual on account of the fog; it did not seem to do much good. I told my mate, on seeing the distant-signal at "danger," to reverse his engine, and put steam against it, and whistle for the guard's breaks; all which he did. We had just before this run over a fog signal, but I did not see the fog signalman. I cannot say exactly where the driver reversed and applied contrary steam, but certainly before reaching the home-signal. The speed then diminished, and was not more than seven miles an hour on striking the other train, the tail lights of which we did not see till we had passed the signal-box. We neither of us jumped off, nor were we hurt. There was no one else on the engine. I attribute our not stopping at the home-signal to the break being out of order.

5. *Philip Oswick*, goods guard five years.—I was in charge of the 8.15 up fast goods train from Norwich for Brick Lane, London, due first to stop at Wymondham at 8.45 p.m. Our load was 17 loaded trucks and a break-van, in which I was alone. I had not been informed that the engine and tender breaks were not in good working order. I had not been with the engine on the previous down journey. The speed did not strike me as being unusually high on approaching Wymondham. I did not hear the fog signal explode near the distant-signal, but I saw this signal at "danger," and on this I at once applied my break. I did not hear the driver give any break whistle till he ran over the fog signal near the home-signal, but I had heard him give the whistle for the signal. The speed at the home-signal was about 10 miles an hour, and no less on the collision occurring. I was prepared for it, and was not knocked down nor hurt. No trucks were off the road or damaged.

6. *Robert Strickle*, driver 25 years.—I was driving the train from Norwich to Wells on the evening of the 13th. I arrived at Wymondham at nearly right time. I got clear signals on running in. We were detained at Wymondham waiting for the down express, and had been standing about half an hour, ready to start, when I was run into from behind without any warning. My mate and I were both on the engine, which was in forward gear, with the breaks off. We were knocked forward along the branch nearly 200 yards, when we stopped by the breaks being applied. We were neither of us hurt. One empty carriage at the back of the train was uncoupled by the blow, and left the rails. I could see signals on entering Wymondham station from 100 to 200 yards off. The fog was shifting. The goods driver told me he could not pull up in time. The down train was just in motion when the collision took place.

7. *William Tuffs*, guard seven years.—I was in charge of the train from Norwich to Wells on the 13th. It consisted of three coaches, a van, and empty carriage. We arrived at Wymondham punctually at 8.15 p.m. We should have started at 8.18, but was detained by the down express being late. I was on the down platform looking after parcels, and was just returning to my van after the down express had started, when the collision occurred without any warning. I was on the ballast, about 10 yards on the up side of the van, when the collision took place. The goods engine did not run so far as me, but my train was knocked on to the branch 200 yards or so. The end of my van was knocked in, and the empty carriage broken up, and detached from the train. I have no idea of the speed of the goods train on collision. Several of the passengers in my train were on the platform. My train had on side lights and a tail light.

8. *Alfred Butters*, guard 17 years.—I was in charge of the 5.10 p.m. down express train from London to Norwich on the 13th ult. We started punctually with 17 vehicles, fitted with the vacuum break on the 12 front vehicles. We lost 21 minutes from slipping (the engine having lost a sand pipe) on Bethnal Green bank, and having to get a pilot engine, and then another five minutes in detaching the pilot engine at Bethnal Green station. We then had a further delay

of three minutes at Walmley signals, and reached Bishops Stortford about half an hour late; having meantime slipped five carriages at Broxbourn. A Bishops Stortford we detached three carriages, and arrived at Wymondham, after making further changes at Cambridge and Ely, at 8.45, 35 minutes late,—having lost three minutes by signals near Cambridge,—with 10 vehicles, my van being at the rear of the train. We left Wymondham at 8.47, having received an “all right” signal from the station-master. Immediately after starting I heard a slight noise, and looked out, but could see nothing amiss, and the train proceeded on its journey. At Trowse (Norwich) I found two carriages in the centre of the train injured on the off side, pieces of the framework being knocked in, and the windows broken. One woman complained of having been hurt. I was quite unaware that there had been a collision, or I should have signalled to my driver to stop. He, and also the front guard, were also unaware that there had been a collision. The fog was not very thick; I could see the length of two telegraph poles (about 120 yards).

The Norwich locomotive foreman states that in consequence of an entry in the repair book, “Break blocks want shifting,” the break was examined and altered, and the book signed with the fitter’s name. The alteration was done two hours before the engine went out of the sheds. After the collision the blocks were found to be working properly.

Conclusion.

It thus appears that on a foggy evening, when signal lights could not be seen at a greater distance than from 100 to 200 yards, the 8.15 p.m. fast goods train from Norwich to London, due to stop at Wymondham, was permitted by its driver to over-run the up home-signal, which, as well as the up distant-signal, was at “danger” against him (at each of which signals he had run over fog signals), for a distance of 300 yards, when it came into a violent collision, at a speed, judging by results, of at least 10 miles an hour, with the branch train for Wells, destroying the rear carriage (fortunately an empty one) in this train, knocking the train some 200 yards along the Wells branch, and driving some fragments of the broken carriage against the sides of three carriages in the down express train from London, which was just in motion towards Norwich when the collision occurred. The engine drawing the goods train was a heavy one, weighing in all with its tender $73\frac{1}{2}$ tons, there being breaks all actuated by one and the same lever on the four coupled wheels of the engine and six wheels of the tender, on which ten wheels there was a weight of about 57 tons, the 17 loaded waggons of which the train was composed weighing about 170 tons, and the break-van 10 tons. There was thus ample break power with the goods train, and it was probably owing to the driver placing too much dependence on this, that he ventured to approach the station after passing the distant-signal at “danger” at so high a speed on a descending gradient of 1 in 184. It does not much improve the driver’s case if the break was, as he affirms, not in good working order, for it was his bounden duty to have seen that the necessary alteration (to which he had drawn attention) had been made in it before he started from Norwich, and, as he failed to do this, he should have approached Wymondham, his first stopping place, with the greatest possible caution, instead of having run the distance (four miles) from Hethersett in eight minutes, goods trains usually taking from ten to twelve minutes. It would appear, however, that the adjustment of the blocks had been seen to before the train started from Norwich.

I was unable to clear up the discrepancy in the evidence of the fog signalman at the distant-signal and the driver of the goods train as to whether the former showed a white or red hand-signal. It has no bearing on the cause of the collision, as the driver acknowledged that it did not influence him in his proceedings.

I have, &c.,

The Secretary,
(Railway Department,)
Board of Trade.

C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above Report were sent to the Company on the 4th March.

GREAT EASTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, London, S.W., 22nd February 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the Order of the 7th instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 31st ult. at Stepney junction station, on the Great Eastern Railway.

In this case, while the 6.13 p.m. Great Eastern Company's down passenger train from Fenchurch Street for Loughton, due to leave Stepney junction station at 6.19 p.m., was standing at that station, it was run into by the 6.14 p.m. London, Tilbury, and Southend Company's down passenger train from Fenchurch Street for Tilbury, due to arrive at Stepney junction station at 6.19 p.m.

Two passengers in the Loughton train and two in the Tilbury train have complained of injury.

There was no damage to rolling stock, nor were any wheels thrown off the rails.

Description.

At Stepney junction station the lines to and from Loughton, Tilbury, &c., join the old Blackwall lines. The platforms on the Loughton, &c. lines are situated on a sharp curve, and it is difficult in some cases for the junction-signalman, who is stationed in a cabin close to the west end of the station and on the north side of the lines, to see a train standing at the Loughton, &c. down platform, as the shed roof over the platform tends to conceal the carriages when standing in certain positions.

In the present case the collision occurred about 60 yards east of the signal-cabin, the tail of the Loughton train being visible to the driver of the Tilbury train for about 100 yards.

The next adjacent signal-cabins to Stepney junction are Devonport Street, about a quarter of a mile west, and Salmon's Lane, 710 yards east of the junction down home-signals, the down starting-signal towards Salmon's Lane being about 360 yards east of the down home-signal.

The lines are worked upon the absolute block system, with this modification, that two down trains may be at one and the same time in the section between Devonshire Street and Stepney junction down starting-signals, the signalman being allowed to take a second down train on line when the first has passed the down home-signals, and is standing either at the Loughton or Blackwall down platforms.

Evidence.

1. *Thomas Perry*, driver seven years with the Great Eastern Company.—I was driving the 6.13 p.m. down train from Fenchurch Street to Loughton on the 31st inst. My engine was a tank engine, running coal-bunk first, and 13 vehicles, including two carriage-breaks with a guard in each. No continuous breaks. I was detained all the way down by signals, and reached Stepney late. I drew well down the platform, perhaps rather lower than usual, to make sure of clearing the crossing to No. 3 up line. I did not notice whether the down starting-signal was off when I arrived. After I had stopped I saw this signal at danger, and it remained so till just before (almost simultaneously as) the collision happened. I got the guards' signal perhaps 1½ minutes before the starting-signal was lowered. While waiting for it the inspector came and asked me what was stopping me. I got no alarm before the blow came, when the breaks were off. Steam was not on, but the engine was in full gear for starting. We were knocked forward about a carriage length. I was not knocked down, but my fireman was, as he was stooping down at the time. I did not look at my watch. We were not detained more than a minute, and went on without having to remove any vehicle. I sounded the whistle when I got the guard's signal to draw the signalman's attention. The up Loughton train was at the up platform when the collision happened.

2. *Alfred Fairman*, guard seven years.—I was in charge of the 6.13 p.m. Loughton train on the 31st.

It consisted of 13 vehicles, and I was in the rear break-carriage. We started one minute late, and were detained two minutes by signals, arriving at Stepney at 6.21, and stopped about 60 yards from the cabin, where we have often stopped before. There were three tail lights on the train, all at the back of the van. The one next the down platform was knocked out. They were all burning before. I saw that the down starting-signal was at danger before I gave the front guard the signal to start, and it remained in this position after I had given the signal till about the same time as the collision, directly after which I turned round to give my driver a red light, and saw the signal off. I was standing against the door of my break; the breaks were off. The train was knocked forward about a carriage length, or rather more; the engine of the Tilbury train stopping dead after striking; the speed could not have been much. I did not know the Tilbury train was coming till I saw the head lights and heard shouting at the same time. We had been at the station two minutes, when the collision occurred at 6.23. I could not see the cabin from where I was standing. The up Loughton train was just coming into the station as the collision happened.

3. *Thomas Tully*, driver 29 years with the Great Eastern Company, employed with the Tilbury trains for the last 24 years.—I was in charge of the 6.14 p.m. train from Fenchurch Street to Tilbury on the 31st ult. My engine was a four-wheeled coupled one, running engine first, with a tender; and a train of

seven vehicles, the first and last having break-compartments, with a guard in each. No continuous breaks. I was detained by signals on the down journey, the Devonport Street home-signal being taken off as I approached it, but the Stepney home-signal, which I saw soon after passing Devonport Street, was off, and remained off till I passed it. I was going to stop at Stepney, and had shut steam off at Devonport Street, and was running at about 12 to 15 miles an hour, when I caught sight of the right corner of the last carriage of the Loughton train when I was about at the signal-cabin. I immediately reversed the engine, and opened the sand-boxes for the driving wheels, and got steam against my engine. The fireman, who saw the train about the same time as myself, and had partly got his break on applied it as hard as he could. I think the speed was thus reduced to three or four miles an hour when we struck; we stopped dead. One of the station officers came running forward with a lamp on the down platform, but we had previously seen the train. I had not time to whistle for the guards' breaks. There was no damage done to my engine. No wheels were off the rails.

4. *James Conary*, guard eight months with the London, Tilbury, and Southend Company.—I was in the front break-compartment of the 6.14 p.m. train to Tilbury on the 31st ulto. We were detained by signal on the down journey; the Stepney junction home-signal was taken off when the train was about its own length past the Devonport Street cabin. I had my break on for entering the station, and observing the tail light on the Loughton train, put my break on still tighter, and saw that my driver was doing his best to stop. I saw a man coming towards us with a red light, but I had seen the train first. I had hold of the break when the collision occurred; the speed was not more than three or four miles an hour. I was not knocked down.

5. *Philip Arbin*, guard 24 years with the London, Tilbury, and Southend Company.—I was in charge of the 6.14 p.m. train to Tilbury on the 31st ulto. It consisted of seven vehicles, with a break-compartment at each end. I was in the rear one. We started punctually, but were detained by signal on the way down. The Stepney down home-signal was on as we approached Devonport Street, but after passing it I saw it had been changed to green. I was not aware that the Loughton train was in the way till we had struck it. My break was then hard on for the ordinary stop at Stepney. I felt the collision slightly, but was not thrown down. The time of collision was 6.21, and we got away at 6.27, no damage having been sustained.

6. *William Henry Orchard*, signalman in the Great Eastern Company's service nine years, all the time at Stepney junction.—I work block-system between Devonport Street cabin, Salmon's Lane, and Limehouse on the Blackwall line. According to the mode of working, I can have two down trains in the section at the same time between Devonport Street and the starting-signal to Salmon's Lane, a third train at the Blackwall down platform, and a fourth between the section and Limehouse, and also four up trains on line at the same time, making eight in all. I never remember having had more than six at the same time, i.e., four up and two down, and this has frequently occurred. The only trains that are out of my sight are the down

trains on the Loughton line, the others I am able to see. I have a boy to assist me, who books all the up trains, and advises Fenchurch Street, but has nothing to do with the block instruments. I came on duty at 2 p.m. on the 31st for an eight hours shift. Bryan, telegraph boy, was alone with me in the cabin when the collision occurred. I received in due course about 6.22 from Devonport Street box, the departure signal for the Loughton down train due at 6.18, it being late, and I put my down needle to "train on line," the train arrived, and I cleared back to Devonport Street, and called the train on to Salmon's Lane, and Salmon's Lane took the signal and gave back "train on line." I got the up Loughton train on from Salmon's Lane directly I called the down Loughton train, and I took it "on line." There was no Blackwall train on at the time. On the down Loughton train being called, I at once lowered the junction home-signal and the starting-signal, and on the train arriving I put up the junction-signal. After the Loughton train had arrived perhaps half a minute, the departure signal was given from Devonport Street for the down Tilbury train. I took it on line at once, but kept on the junction-signal till the train was near down on it, when I pulled it off, having first put up the starting-signal, and then gone to the window to make sure the down Loughton train had started before pulling off the junction-signal. Seeing nothing of it I pulled off the junction-signal. I was waiting, expecting "clear" from Salmon's Lane, as the Tilbury train was running in, and I was quite unaware the Loughton train was still standing at the platform till I saw a red light shown from the platform just before the collision, and I then again pulled off the starting signal, seeing that I had made a mistake. The up Loughton train arrived just before I lowered the signal for the down Tilbury train. The collision occurred at 6.24. The evening was tolerably clear. I did not give "line clear" for the Tilbury train, as its tail was not past my cabin. I think it would be a good plan to have a signal-cabin at the Loughton end of the platform to slot our junction signals.

7. *George Kelly*, inspector, and on the night of the 31st on duty at Stepney station.—I crossed on to the down platform immediately after the arrival of the down Loughton train, at which time the down starting-signal was at danger. Seeing the train stand, and the starting signal at danger, I went down as far as the engine of the Loughton train, which was near the starting-signal, to see if there was anything in the section ahead, knowing that nothing had passed for the last five minutes, and I was just turning round to come back to the signalman when the collision took place. From the time that elapsed I think the down starting-signal must have been put to danger too soon to have allowed the down Loughton train to have done its work and get away.

8. *Alfred Moase*, porter at Stepney 16 years.—I was on the down platform when the down Loughton train arrived. I was standing near the tail of the train. Before the train arrived I saw that the down starting-signal was off, but after its arrival, on hearing the driver whistle, I looked round and saw it was on, and on turning back to inquire of the signalman what had happened I saw the Tilbury train coming in, and tried to stop it with a red light. It was a slight blow.

Conclusion.

This slight collision between the down passenger trains to Loughton and Tilbury was caused by the Stepney junction signalman having taken off the down home junction-signal to admit the Tilbury train to the platform while the Loughton train was still standing there. He declares that after raising the down starting-signal to danger he had looked to make sure that the Loughton train had really started before lowering the down home-signal, and it is possible he may have done so, and yet failed

to see that the Loughton train was still there, it having been to a great extent hidden, owing to the curve in the line and the shed roof over the platform. This signalman is a man of great experience at this very busy junction, and his mistake on the present occasion was owing to his having too soon raised the down starting-signal to danger after the arrival of the Loughton train, and then having taken off the down home-signal before he was absolutely certain that the Loughton train had started. To prevent the recurrence of a similar collision, it is most desirable that some alteration should be made in the arrangements at Stepney junction; either the signal-cabin should be moved to a position where the signalman can command a view of trains standing at all the platforms, or another cabin should be built at the down end of the Loughton platforms. The sections being so short, the former would probably be the better arrangement; but some change is imperatively necessary, as at an exceedingly busy junction such as Stepney every possible means should be employed to facilitate the very arduous and responsible duties of the signalmen.

I have, &c.,

The Secretary,
(Railway Department,)
Board of Trade.

C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above Report were sent to the Great Eastern and the London, Tilbury, and Southend Railway Companies on the 17th March.

GREAT NORTHERN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, Whitehall, London, S.W., 13th March 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 15th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 14th ultimo, near Bawtry station, on the Great Northern Railway, to the up express passenger train, known as the "Flying Scotchman," due in London at 7 p.m.

One passenger is stated to have been injured.

The leading carriage placed next the front break-van was much damaged, having had an axle of the leading pair of wheels broken and the trailing wheels torn from under the body. The second carriage from the front break was also a good deal damaged, but not to the same extent as the first. The pipes in connection with Smith's vacuum break were mostly broken under six out of the eight vehicles which made up the train. The details of the damage to the rolling stock and permanent way are given in Appendices A and B.

Description.

This portion of the Great Northern Railway was opened for traffic in the year 1849, and Bawtry station was constructed on a short piece of level line, about 330 yards in length, and on an easy curve to the right when looking towards the south, having a radius of 70 chains. The south end of this piece of level line ends nearly opposite to the $147\frac{1}{2}$ mile-post from London, and from thence southwards it falls 1 in 198 for about 453 yards; this is succeeded by a piece of level line, something like 500 yards in length, and then the falling gradient to the south of 1 in 198 is resumed. A viaduct, 394 yards in length, over the River Idle, which is twice crossed by it, commences about 85 yards to the south of the end of the first falling gradient of 1 in 198, and this viaduct terminates, where the line is carried over the turnpike road from Gainsborough to Bawtry, by a cast-iron girder under-bridge of 30 feet span. The line is on easy curves to the right after passing Bawtry station, until the commencement of the viaduct is reached, but that is straight from end to end, and the line begins to curve to the left immediately after the bridge over the turnpike road is passed over.

The permanent way of this portion of the line was relaid in October 1875 with bull-headed steel rails that weighed 81 lbs. per yard, in lengths of 21 feet; the rails being fixed in cast-iron chairs, each weighing 40 lbs., by compressed oak keys, placed outside the rails, and the chairs fastened to transverse sleepers by two oak trenails

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Commencement of mark
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NOTE.

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Red lines she

Scale $1\frac{1}{2}$ Inches to a foot.

$\frac{1}{16}$

$2\frac{1}{8}$

$\frac{1}{4}$

and one iron spike to each chair; the sleepers, of Baltic red wood creosoted, are 9 feet long by 10 inches by 5 inches rectangular, and placed 2 feet $8\frac{1}{2}$ inches apart from centre to centre; the ballast is of cinder, and stated to be 18 inches in depth. The line appeared to be in very good order.

When this line was first opened for traffic, Bawtry Viaduct was constructed of wood; but this viaduct was renewed in brick in the year 1859, and it was provided with a coping of stone on the parapets on each side, and the top of this coping only stood at from $7\frac{1}{2}$ to 10 inches above the level of the rails.

Evidence.

Frederic Tilley, driver of the 10 a.m. up express train from Edinburgh on the 14th inst., and the 3.5 p.m. from York, eight years an engine-driver, and 18 years in the Company's service, states: I joined the train at York with No. 215 Great Northern engine, a single engine and tender, and eight vehicles. We left York at 3.6, and we are not appointed to stop until we get to Grantham. As far as I know, all went right until after we had passed Bawtry station, and just as we were about to enter on the viaduct I felt a jerk on the engine, shut off the steam first, and then I looked back, and I saw that there was somewhat amiss with the train. I was standing on the right side of the engine as we were running. I saw that the first carriage in the train, that next to the break-van next to the tender, was oscillating. I could not see that it was off the rails, and I then applied the vacuum break, at the spot which I pointed out on the ground to-day, and the vacuum break appeared to act as it usually does. The communication cord had not been pulled up to the time when I felt the jerk. It was pulled after I had applied the vacuum break. My train was fitted throughout with the vacuum break, on four wheels of the engine, tender, and all the vehicles in the train. Besides applying the vacuum break, I sounded the whistle for the breaks, and my mate applied the hand-break on the tender. I did not see that any vehicle was off the rails until we were about to pass the bridge over the Gainsborough Road. At the time we passed Bawtry I think we were travelling at the rate of 60 miles an hour. The application of the breaks appeared to lessen the speed considerably. I felt a jerk as the train passed the under-bridge, over the Gainsborough Road, at the south end of the viaduct. I did not feel the jerk very much, and I think my train was travelling at 10 miles an hour when I felt that jerk. The vacuum break seemed to cease acting when I felt that jerk in passing over the Gainsborough Road. I had observed that one of the carriages was off the rails to the left before we got to that road, and I also saw that it was getting further away from the rails, and after feeling the jerk I turned the steam partly on, in order to get the carriages more into line. After passing that road I saw that more than one carriage was off the rails, and we stopped with the engine slightly ahead of the spot where the carriage now lies at the side of the line. When we stopped, all the carriages were still coupled together, and four altogether were off the rails, viz., the second and third, and sixth and seventh vehicles from the tender, with all their wheels off. The engine and tender and front break-van, and the fourth and fifth vehicles and the rear break-van remained on the rails. We stopped at about 4 o'clock. Both of the front wheels of the first carriage (a composite) were under that carriage when we stopped. The right wheel (with the long piece of the axle) as we were running had the axle still in the axle-box, and it was standing upright, and the left wheel lay on its side under the carriage. The rear pair of wheels of that carriage had been torn from the rear end of the carriage and had run down the embankment on the east side of the line, after passing over the Gainsborough Road. The engine and tender were all right. The vacuum pipe was broken underneath the first carriage, and the vacuum pipes which connected the first carriage with the second, which were both off the rails,

had become disconnected, and also from the front break-van to the carriage next to it. I cannot say whether the third vehicle was off the rails as well as the second vehicle before the Gainsborough Road Bridge was reached.

Eli Addeleece, fireman to Frederic Tilley, four years a fireman, and seven years in the Company's service, states: I rode on the near or left side of the engine, and I did not become aware of anything being wrong until just as we were entering upon the viaduct (Bawtry), when I felt a jerk on the engine, and on looking back on the left side of the train, I saw the carriage next the front break had the front wheels off the rails. I put on my hand break. The communication cord had not been made use of up to that time. I think our speed at that time was near upon 60 miles an hour. I looked across to my mate and said "We are off the road," and at that same time he was applying the vacuum break. The breaks appeared to act all right until the wheel of the first carriage (second vehicle from the tender) struck the south abutment of the under-bridge. The carriages appeared then to come on to us, and at the same time I eased my hand break. We were then just over the viaduct. I said to my mate, "Let us be over the viaduct; I think it will be better for us," and we went on then till we stopped. I think the vacuum break ceased to act when we struck the abutment of the bridge, when the carriages seemed to come on to us. I don't know what time it was when we stopped. I did not see the rear pair of wheels of the first carriage torn from under the carriage. All the train remained coupled together. The second and third and the sixth and seventh vehicles from the tender were all off the rails. The second vehicle was lying down on the steps, partly tilted over to the left side. The rear wheels were gone; one of the front wheels, that which had the axle broken close to the boss of the wheel, was under the carriage. I don't know whether that was a right wheel or a left wheel. I don't know where the other wheel was. The communication cord, which is attached to a lever that puts on the vacuum break, was pulled just at the time that my mate applied the vacuum break. I heard a passenger, immediately after the accident, say that he had pulled the communication cord. He did not say in which carriage he had been riding, and I don't know.

John McDiarmid, conductor in charge of the 10 a.m. up express train from Edinburgh on the 14th instant: My train consisted of East Coast Joint Stock carriages, viz., 6-wheeled break-van, No. 111; No. 17, 4-wheeled composite; No. 28, 4-wheeled composite; No. 8, 4-wheeled composite, first-class; No. 87, 6-wheeled, first-class; No. 2, 4-wheeled, first-class; No. 12, 4-wheeled, second-class; No. 49, break-van, 6-wheeled, arranged in that order when we left York at 3.6 p.m. We were checked two minutes at Joans Cross junction, south of Selby. We travelled all right until we passed Bawtry station, and just at the commencement of the viaduct the bell in my van (the front break-van) rang loudly. I put down the window and looked out on the near side, and looked back, and saw that the carriage next to my van was off the road, and I then looked immediately forward to see if the driver was aware of it, and I saw that he was aware of it, as he was looking

back. I endeavoured to put on my hand break. I could not say whether I was aware or not as to the vacuum break having or not having been applied at that time. After we crossed over the girder bridge I knew that the vacuum break had been put on. We were travelling at our usual rate as we passed Bawtry, which might be 55 miles an hour. There was a diminution in the speed of the train after I heard the bell ring in my van. I only partially applied my hand break. I don't know what time it was when we stopped. There were four vehicles off the road. I don't know where the wheels of the front carriage were, as I went on at once to the next station a head. There was nothing foul of the down line, but something projected into the six-foot space. No one complained at the time of being injured. I went on with the passengers afterwards to London. The vacuum break was applied in crossing the swing bridge at Selby, at Joans Cross junction, and in running through Doncaster, when the speed was reduced to 16 miles an hour.

Charles Day, under-guard of the 3.5 p.m. up express train from York on the 14th instant, states: I rode in the rear break-van, and travelled all right, as far as I know, as far as Bawtry, and we were on the Bawtry Viaduct when I felt the speed of the train checked. I don't know that the break in my van was applied. I did not look out when I felt the speed checked. We were travelling at our usual speed, and keeping time as we passed Bawtry, at from 55 to 60 miles an hour, and I did not know that anything whatever was wrong until the train stopped. I was not aware that the vacuum break had been applied. I knew that it had been used in passing through Doncaster station yard. When I had got out of my van it wanted about 1 minute to 4 o'clock. I got out after I had taken up my signals and fog-signals. I could not see that anything was foul of the down road.

Thomas Bennett, locomotive foreman at the running shed at Doncaster, states: I got to the scene of the accident about 6 p.m., and found four of the vehicles off the road; No. 17, first carriage, with the leading axle broken, at the left side, close to the boss of the wheel, and that left wheel was under the carriage, lying on its side, with the journal downwards. The right-hand wheel had the journal in the axle-box, and the axle-box in the horn-plate, and the end of the axle on the ground, underneath the carriage. The carriage was partly on its left side, and the rear pair of wheels were down the embankment, where they now lie. I got everything off the up line by about 10.50 p.m., and brought all the vehicles into the Bawtry sidings except the last van, which had been previously removed. There was another axle also broken on No. 2 carriage, or the last carriage but one in the train. I think the

accident was occasioned by the breakage of the front axle of the first carriage. I don't know anything of the history of that axle, nor how long it has been running. The fracture showed that it had been partially fractured for some time; it is five inches in diameter. I think more than one half of that axle had been sound immediately before the accident occurred. I do not think any spring was missing from any other carriage than the first carriage. I think the break draw-rod, which was taken out to-day from under the platform at Bawtry station, belonged to the first carriage. I don't think anything was wrong with the vacuum break, except as regards the connections at the two ends of the first carriage, and the break apparatus under that carriage. I don't think the cord communication was broken. There were many chairs broken under the left rail. I cannot say how many.

John Shotton, assistant locomotive superintendent at Doncaster: I have examined the broken axle of the first carriage. We do not keep any record of the mileage of the wheels of carriages or waggons. We do of engines. We do frequently take axles out of the wheels and break them, but we never put them in again. We only take them out to test the make or the soundness of the axle. I believe the accident was occasioned by the fracture of the axle of the first carriage. I don't know when any examination was made of that axle in the shops, but it would be examined when in the shops. No. 17 carriage was in the shops last November; nothing was done to the wheels, and no remark about them. I don't think the sound part of the axle of No. 17 carriage was more than $2\frac{1}{2}$ inches in diameter. I think there was a small flaw originally near the outer surface of the axle, but I don't think it extended to the outer surface, so as to be seen.

F. P. Cockshott, superintendent of the Great Northern Railway Company, states: The axle which was found broken under No. 17, East Coast carriage, on the day of the accident is marked "Taylor's best double fagotted, May 1868, E.C." The wheels which were on the axle are marked "Leeds Wheel and Axle Company, Leeds, 1868, E.C." The whole of the East Coast Joint stock was new, and brought into use in the summer of 1868. In January 1878 the East Coast Companies decided to replace the whole of the stock which had been supplied ten years previously, and ordered carriages to be built of the most modern description, and with all recent improvements. This new stock has been constructed, and is being brought into use. The special through Scotch express trains are now formed of these new carriages, and those built in 1868 have been withdrawn from the service, or will be entirely within the next few days.

Conclusion.

From the preceding statements, and from observation on the ground, it appears that on the 14th ultimo, when the 10 a.m. up express passenger train from Edinburgh to London left York station at 3.6 p.m., one minute late, it consisted of the following vehicles:—

- An engine and tender;
- No. 111, 6-wheeled break-van;
- No. 17, 4-wheeled composite carriage;
- No. 28, 4-wheeled composite carriage;
- No. 8, 4-wheeled first-class carriage;
- No. 87, 6-wheeled first-class carriage;
- No. 2, 4-wheeled first-class carriage;
- No. 12, 4-wheeled second-class carriage;
- No. 49, 6-wheeled break-van,

arranged in the order in which they are here enumerated.

This train is not appointed to stop prior to reaching Grantham station, 83 miles from York, and it is allowed one hour and forty minutes for the journey, giving an

average rate of speed of about 49.8 miles an hour; but the actual speed at times must necessarily be considerably in excess of the average rate, inasmuch as the train is required to run through several of the stations and past some of the junctions at reduced speed.

When this train had just passed Bawtry station, $40\frac{3}{4}$ miles from York, and was about to enter upon the Bawtry Viaduct, before referred to, the engine-driver felt a jerk, and he immediately shut off the steam and looked back, and saw that there was something amiss with his train, and that the first carriage, No. 17, placed next to the front break-van, was oscillating; he could not see from the side of the engine on which he was standing (the right side) that it was off the rails, and he then applied the vacuum break with which the entire train was fitted, with breaks on all the wheels of the vehicles in the train, with the exception of the leading wheels of the engine. In the meantime the fireman had also felt the jerk on the engine, and he also looked back on the left side of the train, and saw that the leading wheels of No. 17 composite carriage were off the rails to the left as the train was running, and he told his mate that they were "off the road." The driver and fireman agree in saying that they were travelling, at the time they passed Bawtry station, at the rate of 60 miles an hour (the conductor and guard naming from 55 to 60 miles an hour), and they also state that the vacuum break appeared to act, as it usually does, when the driver applies it, and both also state that, *after* the vacuum break had been applied, the communicating cord with which the train was fitted, and which is attached to the lever that applies the vacuum break, was pulled, evidently by some passenger. The conductor in the front van states that the bell in the front break-van "rang loudly just at the commencement of the viaduct," but "he could not say whether he was aware or not as to the vacuum break having or not having been applied at that time," but "after they had crossed over the girder bridge, he knew that the vacuum break had been put on;" he only partially applied his hand break, while the fireman states that he put on his hand break. The guard in the rear break-van did not know that the vacuum break had been applied, but when on the Bawtry Viaduct he felt the speed of the train checked, and was not aware that anything was wrong until the train stopped.

The driver also states that "the application of the breaks appeared to lessen the speed considerably; that he felt a jerk as the train passed the under-bridge over the Gainsborough Road at the south end of the viaduct, and his train was travelling at 10 miles an hour when he felt that jerk," and "the vacuum break seemed to cease acting when he felt that jerk;" "that he had observed that one of the carriages was off the rails, to the left, before they got to the Gainsborough Road, and he also saw that it was getting further away from the rails; and after feeling this jerk he turned the steam partly on, in order to get the carriages more into line. After passing that road, he saw that more than one carriage was off the rails, and they stopped with the engine slightly ahead of the spot where the carriage was laid at the time of my inquiry at the side of the line." He says, "all the carriages were still coupled together, and four altogether were off the rails, viz., the second and third, and sixth and seventh vehicles from the tender, with all their wheels off, while the engine and tender, front break-van, and the fourth and fifth vehicles and the rear break-van remained on the rails. The train stopped at about 4 p.m. Both of the front wheels of the first carriage (No 17, of which the axle was broken) were under that carriage when the train stopped. The right leading wheel, with the long piece of the axle attached to it, had the journal of the axle still in the axle-box, and the axle-box was in the horn-plate, and the wheel was standing upright, and the left wheel (of this pair) lay on its side under the carriage. The trailing pair of wheels of that carriage had been torn from the rear end of the carriage, and had run down the embankment on the east side of the line, after passing over the Gainsborough Road Bridge."

The vacuum tubes and breakwork were found broken under all the carriages, and the vacuum pipes which connected the first carriage with the second, both of which were off the rails, had become disconnected, and the vacuum pipe between the front break-van and the composite carriage next to it, No. 17, was also disconnected or broken.

The spot on the line before the Bawtry Viaduct was reached was pointed out to me by the engine-driver where he felt the first jerk, and then shut off the steam, and also where he states that he applied the vacuum break. I was also shown the first trace of any wheel being found off the rails. This was a mark on the ballast on the *inside* of the *right rail*, 18 yards south of the north end of the up platform at Bawtry

station, and marks on the inside of the chairs, some of which were broken under the right rail, continued up to 61 yards from the same point. At 65 yards the first mark of any wheel *outside* the *left rail* was found on the ballast, and a yard beyond it a chair under the left rail was found broken. Marks on the up platform, $3\frac{1}{4}$ inches from its edge, and apparently caused by a bolt head under a carriage step, were traced from 71 to $72\frac{3}{4}$ yards, and a portion of an iron break-rod was found thrust through a sleeper outside the left rail, at 72 yards, the length of this piece of break-rod being about 7 feet. Marks outside the left rail and inside the right rail were traced at intervals from 72 to 112 yards, and a continuous series of marks made by one wheel *outside* the *left rail*, and by another wheel *inside* the *right rail*, on chairs, many of which were broken; on the edge of the coping of the up platform at Bawtry station; over the rails of a cross-over road; on a planked crossing; on the girder of an under-bridge at the south end of Bawtry station, where a portion of a continuous foot-board of a carriage was also found; and similar marks continued up to 318 yards, and at intervals up to and along the Bawtry Viaduct. Besides the marks made by two wheels running off the rails, other marks were occasionally found, which must have been made by some of the broken gearing under a carriage trailing on the ballast. The band of a spring of a carriage was found outside the right rail at 430 yards. In some cases the wheel marks were as far as 2 feet outside the left and 1ft. 8in. inside the right rail, and these marks afforded distinct proofs that they were made by separate wheels running independently of each.

The north end of the Bawtry Viaduct occurs at 752 yards from the north end of the up platform, and the spot where the driver states that he applied the vacuum break is at 837 yards. Several pieces of the spring of a carriage were found outside the right rail between 823 and 948 yards.

At 1,125 yards the stone cap of the eastern pier on the north side of the Gainsborough Road Bridge had been heavily struck by a left wheel and was thrown down into the road below, and a left wheel appears to have run on the top flange of the eastmost cast-iron girder (3 feet deep), one of the pair which carried the up line of railway across this 30-feet opening over the Gainsborough Road. The mark on this flange showed that the flange of a left wheel travelled along the *very edge* of this top flange, so that if it had been running half an inch more to the left, it is almost certain that the leading carriage to which it belonged, No. 17, must have fallen over into the road below, and been followed in all probability by every other vehicle behind it in the train, as there was no outside girder to support and uphold the wheel if it had dropped off the top flange of the girder.

The stone cap of the eastern pier on the south side of the Gainsborough Road was next struck by some left wheel or wheels, and a break-block, axle-box, and portion of a step were found below on the south side of the Gainsborough Road.

The Bawtry Viaduct is stated to end at 1,146 yards, and between this spot and that at which No. 17 carriage stopped, viz., at 1,277 yards, a number of sleepers and chairs were found broken, and portions of the break gearing and under-framing of the carriages were scattered about.

The trailing wheels of No. 17 carriage began to run down the embankment at the eastern side of the line at 1,206 yards. I have no doubt that these wheels had come in contact with the stone coping at the Gainsborough Road, and were torn from under the carriage immediately afterwards.

Thus from the spot at which the driver states that he applied the vacuum break, to that at which the engine stopped, would be about 470 yards, although he had very properly partially turned on the steam when he saw the carriages getting further away from the line after passing over the Gainsborough Road.

I have no doubt that the accident was caused by the fracture of the axle of the leading pair of wheels under the first 4-wheeled carriage, No. 17, in the train, and that such fracture occurred immediately before the first mark which was found on the ballast inside the right rail at the north end of Bawtry station; and that the revolution of the long piece of the axle which was still attached to the right wheel, which kept its position in the axle-box, &c., broke the break-rod, of which a portion, 7 feet in length, was found, thrust through one of the sleepers under the rails 54 yards further on.

The fracture of the axle took place close to the boss of the left wheel, and the revolution of the long piece of the axle continued to mark and to damage the woodwork of the left wheel (a Mansell wheel), and possibly other parts of the break gearing under that carriage.

I have no means of saying positively, whereabouts on the line, the break-pipe

apparatus for putting the vacuum breaks into operation on the various wheels of the vehicles in the train, or that part relating more particularly to No. 17 carriage, was fractured or damaged; but if dependence is to be placed on the evidence of the Company's servants in charge of the train, there would seem to be little doubt but that it occurred while No. 17 carriage was passing over the girder bridge at the Gainsborough Road.

The advantages attendant on having a thoroughly efficient continuous break, made automatic in its action, can scarcely be questioned; but in this instance, it appears to me, that it would be impossible for any such accident to have occurred, and to have terminated, in a more favourable manner, as far as the safety of the public is concerned, than in this case.

In this instance Smith's vacuum break was not fitted with double ejectors (one for the engine and one for the train), although this arrangement is stated to be generally adopted and approved of by the inventors, and in my opinion it is very fortunate that it was not so fitted, inasmuch as it is quite possible that the engine break might have been put hard on, while the breaks on the carriages might have only been partially on, and in that case the results would probably have been disastrous, as No. 17 carriage with a broken leading axle and the leading wheels running off the rails would probably have been forced out of the train, and over the excessively low parapet of the Bawtry Viaduct, or at the bridge over the Gainsborough Road, by the sudden check in the speed of the engine.

On these grounds, however convenient it may be in some respects to have double ejectors for the vacuum breaks, I have no doubt that they would become an unnecessary source of danger, when a carriage in the middle of a passenger train from any cause gets off the rails.

Indeed the action of all the newly invented breaks is in one respect objectionable and dangerous, in this class of accident, from the fact of the retardation commencing at the front and gradually extending more or less quickly to the vehicles at the rear of the train. It would be highly desirable and tend to increase the chances of a favourable result, when an accident of this kind does occur, if the breaks were first put on, on the vehicles at the tail of the train.

The axle which broke under the leading pair of wheels under No. 17 carriage was 5 inches in diameter where the fracture took place. It was new in 1868, and it is marked "Taylor's best double fagotted, May 1868, E.C." The wheels which were on the axle are marked "Leeds Wheel and Axle Company, Leeds, 1868, E.C." The whole of the East Coast Joint stock was new, and brought into use in the summer of 1868. The Company are unable to give any history of the running of this pair of wheels, as they do not keep any record of the running of carriage or waggon wheels, but the Company's assistant locomotive superintendent, Mr. Shotton, informed me that the wheels would be examined when they were last in the shops, and he subsequently ascertained at my request that No. 17 carriage was in the shops last November, that nothing was done to the wheels, and no remark was made about them. Indeed Mr. Stirling, the Company's locomotive superintendent, has informed me that "he could give no extracts from the books showing dates and nature of repairs done to the wheels which have been broken in the Bawtry accident; that they keep a general wheel and axle account, not for each individual pair of wheels." When the fractured axle was examined after the accident, it was found that there had originally been a small flaw near the outer surface of the axle, but Mr. Shotton did not consider that it extended to the outer surface so as to be seen. The axle had evidently been gradually breaking, and Mr. Shotton did not think that the sound part of the axle was more than $2\frac{1}{2}$ inches in diameter. In my opinion, the sound part of the axle would not amount to anything like one fourth of the superficial area of the section which would be represented by a diameter of $2\frac{1}{2}$ inches. I had asked for a photograph of the end of the axle which was broken, as I thought it would show, better than any drawing could do, what was sound and what had previously been fractured, but I have been supplied with a photograph of the inside of the wheel, and a drawing of the end of the axle, which, however, is not, I think, a good representation of its state. I should also mention that after the accident the axle of another pair of wheels under No. 2 four-wheeled first-class carriage was also found broken, and this fracture was probably occasioned by getting off the rails after passing over the Gainsborough Road. In this instance also the axle had previously been partially fractured, leaving the central sound portion of an elliptical shape $3\frac{1}{2}$ inches in diameter in one direction, and 3 inches in diameter in the other, and at right angles to it, and the amount of the sound part of the sectional area of the broken axle would be somewhere about 42 per cent. This

wheel and axle was made at the same time and by the same makers as that which broke under No. 17 four-wheeled composite carriage.

This accident discloses a very serious condition of things as far as the safety of the public is concerned, in respect of the axles of wheels under carriages in passenger trains, which are frequently running at a rate of 60 miles an hour, as in this case, where the strength of the axle has been gradually reduced to less than one fourth of its original strength.

Some test that may be depended on is required, or some examination of these axles should be periodically made, by removing the wheels from the axles and carefully examining the parts of the axles within the wheels, and at other times by thoroughly scraping off all paint or rust close to the bosses of the wheels, where the fractures mostly take place, or by keeping an accurate record showing the number of miles run, and the extent to which the diameters of the axles in the journals are reduced by fair wear and tear, when fractures do occur, so as to endeavour to establish some data that will throw light on the length of time, or the number of miles that may be run, before an axle may be expected to break. The diameter of the axle in the journal under No. 17 carriage, which broke on the 14th ultimo, had been reduced from $3\frac{1}{4}$ to $3\frac{1}{8}$ inches, and the same diminution in the diameter had taken place in the journal of the second axle which was broken, although it had, in my opinion, nothing to do with causing the accident. It is true that some railway companies do keep a record of the running of the wheels under engines, and some have kept a similar record with reference to the mileage run of wheels of carriages and waggons, but there is no uniformity of practice on the subject. I scarcely think anyone will, after this accident, venture to question the propriety of some steps being taken to acquire knowledge on the subject. The East Coast Railway Companies are now about to withdraw the carriage rolling-stock on their line, which was brought into use in the summer of 1868, of which No. 17 4-wheeled composite carriage formed part, and to replace them with 6-wheeled carriages, and there is no doubt that this is a very important and desirable change as far as the public safety is concerned.

There is only one other point to which I must direct attention, and that relates to the necessity that exists for raising the parapets at the sides of the Bawtry Viaduct to the usual height, and also to the addition of outside girders at the bridge over the Gainsborough Road, because a height of $7\frac{1}{2}$ to 10 inches for the top of the parapet above the level of the rails will not afford any security in the event of a carriage getting off the rails at the outer sides of the running lines, or do much to prevent them from running over and falling off the viaduct; and the safety of the platelayers employed on the line is not properly provided for by this exceedingly low parapet.

This report has been delayed by the non-receipt of the drawings of the wheel and axle until this day.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

APPENDIX A.

The Great Northern Railway, Locomotive
Department, Engineer's Office,
Doncaster, 7th March 1879.

DEAR SIR,

BAWTRY ACCIDENT.

I SEND you with this the required particulars respecting the above.

Yours truly,
P. STIRLING.

Col. Yolland,
Board of Trade, Whitehall, London.

DETAILS of STOCK DAMAGED at BAWTRY, 14th February 1879.

No. 17, East Coast composite, 25*l*. :— 1 sole, 1 headstock, 1 crossbearer, 2 diagonals, 4 side springs, 4 axle guards, 4 axle boxes, 1 axle, socket bolts, 2 drawbars, vacuum tubes and brakework, floor of body, 1 bottom side, 1 corner pillar, 6 end panels, 1 side panel and lining boards, 6 lamp irons and body

bolts, 4 step boards, and step irons broken; 1 axle and 4 buffer rods bent; 4 wood wheels damaged, and standing pillars do.

No. 28, East Coast composite, 15*l*. :— 4 end panels, 2 bottom sides, 1 door pillar, 1 standing pillar, 1 door panel, 1 side panel, 2 vacuum tubes, 2 hose pipes and brakework, 1 longitudinal, 1 diagonal, 2 step boards, 4 step irons, and body bolts broken; 1 headstock and corner plates damaged; lifting and readjusting ironwork.

No. 8, first class, East Coast, 4*l*. :— Vacuum tubes and hose pipes, 1 buffer spring, and body belts broken; lifting and readjusting ironwork.

No. 87, first class, East Coast, 3*l*. 10*s*. :— Vacuum hose pipes and body bolts broken; lifting and readjusting ironwork.

No. 2, East Coast, first class, 6*l*. 10*s*. :— 1 axle, 1 side spring, and body bolts and vacuum brakework broken; lifting and readjusting ironwork.

No. 12, second class, East Coast, 3*l*. 10*s*. :— Socket bolts, body bolts, and vacuum brakework broken; 4 buffer rods bent; lifting and readjusting ironwork.

No. 111, guard's break-van, East Coast, 3*l*. 10*s*. :—

1 drawbar bent ; 2 side chains bent ; lifting and re-adjusting ironwork.

Weight of No. 17, East Coast composite, 9 tons 7 cwt.

7th March 1879.

P. STIRLING.

The Great Northern Railway, Locomotive Department, Engineer's Office,
Doncaster, 12th March 1879.

DEAR SIR,

I SEND you herewith a drawing of the wheels and axles that were under the leading end of No. 17, East Coast composite carriage, also a photograph of the wheel after the accident. I can give no extracts from the books showing dates and nature of repairs done to the wheels which have been broken in the Bawtry accident. We keep a general wheel and axle account, not for each individual pair of wheels. The wheels and axles under No. 2, East Coast first-class carriage, were made by the same maker, and to the same specification, and at the same time as those under No. 17.

Yours faithfully,
P. STIRLING.

Colonel Yolland,
19, Downing Street, London.

APPENDIX B.

The Great Northern Railway,
Engineer's Office, King's Cross,
London, N., 21st February 1879.

Injury to permanent way at Bawtry on the 14th inst. by broken axle under the Scotch express.

DEAR SIR,

100 sleepers broken.
150 chairs on the outside rail.
61 do. on the inner rail.
3 switch slide chairs at the end of the cross-over road, south end of platform.
20 fish bolts.
50 plain spikes.
600 F keys.
40 E keys.
800 treenails.
3 wrought-iron bell cranks.
2 switch rod rollers.

The down distant signal wires were broken, and the following damaged :—

Flags at south end of up platform.
Brickwork of pier of girder bridge.
Stonework of both piers south end of viaduct.
Post and rail, and pale fencing.
Trunking of switch rods.

Yours faithfully,
RICH. JOHNSON.

F. P. Cockshott, Esq.

Printed copies of the above Report were sent to the Company on the 29th March.

HIGHLAND RAILWAY.

Board of Trade, (Railway Department,)

13, Downing Street, London, S.W., 15th March 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 27th ultimo, the result of my inquiry into the causes of an accident which occurred on the 24th ultimo on the Highland Railway.

In this case, as the 10.18 a.m. up mail train from Inverness, consisting of two engines and tenders, nine fish trucks, post-office van, front break-van, third-class carriage, composite, first-class carriage, composite, and rear break-van, was travelling between Newtonmore and Dalwhinnie stations the leading engine left the rails, and was followed by the whole of the vehicles composing the train.

The accident occurred at 1.27 p.m., and the train was running at from 26 to 30 miles an hour at the time.

No passengers or servants of the company are returned as having been injured.

The leading engine ran over the bank into a river, and was much damaged, and the tender of this engine, which was thrown bottom upwards into the river, 50 yards from the engine, will have to be entirely rebuilt. The train engine and tender were upset on the top of the bank, and the four leading fish waggons were also upset. The other vehicles in the train remained in an upright position, but were all off the rails.

A detail of the damage to the rolling stock is appended.

The right-hand rail for a distance of 120 yards was wholly displaced ; two rails were broken and many others bent ; the joints, most of the chairs, and several sleepers were broken, and many sleepers were cut and marked. On the left side the rails and joints were not damaged, but 35 chairs were broken or chipped.

Description.

Inchlea, the scene of this accident, is 81 miles south of Inverness, $8\frac{1}{2}$ miles south of Kingussie, and $4\frac{1}{4}$ miles north of Dalwhinnie station. On approaching from the north, the line, following the course of the small river Truim, ascends a steep incline, the gradients for about five miles up to Inchlea being 1 in 95, 1 in 200, 1 in 100, 1 in 150, and 1 in 360 ; the last-named gradient changing to one of 1 in 1,450 a few yards before the spot where the engine first left the rails. The curves are frequent, though not very sharp, and there are short lengths of straight between all the reverse curves. For

about 400 yards before the first mark of the run-off, the curve is one to the left, with a radius of 36 chains. A few yards beyond this mark there commences a length of about 50 yards of straight, and there is then for about 500 yards a reverse curve to the right, with a radius of 36 chains.

The river opposite to the point where the engine first left the rails is about 30 yards from the line and some 25 feet below it; but further south, where the engine ran over into the river, this distance is reduced to only about 15 yards, the bank being very steep.

The line at this point, and for $2\frac{1}{4}$ miles north of it, has been recently relaid, partly in 1876 and partly in 1877, the permanent-way now consisting of bull-headed steel rails, weighing 75 lbs. per yard, in lengths of 30 and 24 feet, laid in cast-iron chairs weighing $37\frac{1}{2}$ lbs., each secured by three spikes to sleepers of Strathspey fir, 9 ft. long and 10 ins. \times 5 ins., placed at an average distance of 3 ft. apart. The joints are fished with wrought-iron fish-plates 18 ins. long, and weighing 20 lbs. per pair, with four $\frac{7}{8}$ -in. nuts to each pair. The spikes are of wrought iron, $\frac{3}{4}$ in. in diameter, and $5\frac{1}{2}$ ins. in length. The keys are of compressed oak.

The leading engine (No. 51) is a four-wheel coupled tender engine, with 3 ft. 6 ins. leading wheels, and 5 ft. driving and trailing wheels, the weights on each pair of wheels being as follows:—

				Tons.
Leading wheels	-	-	-	$10\frac{1}{2}$
Driving	„	-	-	13
Trailing	„	-	-	$12\frac{1}{2}$
Total				<u>36</u>

The tender is a six-wheeled tender, with one break-block on each wheel.

This engine was made in 1864, and has run altogether 339,876 $\frac{1}{2}$ miles.

The leading axle, which was broken, is one of the original set which came with the engine. It was manufactured by Messrs. Brown and Co., of Sheffield, of toughened steel, the diameter at the journal being $4\frac{1}{2}$ ins., at the boss 6 ins., inside the boss $6\frac{1}{2}$ ins., and at the centre $5\frac{1}{2}$ ins. There is no exact record of the running of this particular axle, but it is believed to have run about 250,000 miles. The journal, which, when new, was 8 ins. long and $4\frac{1}{2}$ ins. in diameter, is now $8\frac{1}{16}$ ins. long and $4\frac{7}{8}$ ins. in diameter.

This axle was placed under the engine on the 18th February, only six days before the accident, to replace a precisely similar axle which had broken on the 16th February, when running between Aviemore and Kincaig.

The engine had been thoroughly repaired, and the wheels turned up in November 1878.

The train engine (No. 64) is a four-wheel coupled tender engine, with leading four-wheeled bogie, the weights being as follows:—

				Tons.
On bogie	-	-	-	$14\frac{1}{2}$
Driving wheels	-	-	-	$13\frac{1}{2}$
Trailing	„	-	-	13
Total				<u>41</u>

The tender is a six-wheeled tender, with one break-block on each wheel.

In addition to the two tender breaks there were hand breaks in the two break-vans.

The fish trucks are of the pattern in use for fast traffic, with spring buffers and screw couplings.

Evidence.

James Ramsay, driver 16 years, states: On the 24th February I was driver of the 10.18 a.m. up mail train from Inverness. The train consisted of engine and tender, nine fish waggons, post-office van, break-van, four coaches, and rear break-van. At Kingussie the pilot engine was attached in front. We left Kingussie at 1.7 p.m., 15 minutes late, and passed Newtonmore all right. About $5\frac{1}{2}$ miles south of that place, about 25 to 30 miles an hour, when I saw the pilot engine suddenly drop in front. I was standing on the left side of my engine. I immediately shut off steam and reversed my engine, getting back

steam, but within about the length of my engine and tender we ran off the rails to the right of the line. The driver of the pilot engine sounded his whistle, but I had no time to do so before we were off the rails. We ran along with the right wheels outside the line and the left in the four-foot for some distance, and then off the line altogether. We ran about 120 or 130 yards before we came to a stand. My engine and tender were at the edge of the bank falling to the river, and, the moment we stopped, my engine fell right over on the bank with the wheels uppermost. I had stuck to the engine, and so had my mate. I was only a little shaken, and on getting out I found that

the pilot engine had run right over the bank into the river and had turned half over ; the tender had parted and been pitched out over the bank, and was lying bottom upwards in the river about 50 yards off. My tender was half over, and the leading fish waggons thrown up against it, some of them being upset. All the rest of the train was off the rails, but none of the vehicles were upset. The road had been running quite smoothly all the way up. I didn't alter my speed at all on getting to the top of the incline. I couldn't find anything wrong with the road. I felt nothing wrong before I saw the pilot engine drop off. I can't remember seeing the pilot's tender going over the bank. The rear coupling of my engine came unhooked, but was not broken. The ground was frozen very hard, and it was very rough and stony at the side of the line. I cannot account for the accident. My engine is a four-wheel coupled engine with front bogie, and with a six-wheeled tender, having one break-block to each wheel.

David Fraser, fireman nine years, states : I was fireman to James Ramsay on the 24th February. We were running 25 or 30 miles an hour when the accident occurred. I felt no jerk before the pilot engine left the rails. I stuck to the engine and was not hurt. We had been running very smoothly, and hadn't increased our speed.

Andrew Mackenzie, driver four years, states : I was driver of the pilot engine on the 24th February. I hooked on to the 10.18 a.m. up mail train at Kingussie. Everything went all right until we got about $5\frac{1}{2}$ miles past Newtonmore, when, as we were running about 30 miles an hour, I noticed a slight jerk just as if we were going over a joint in a rail,—no more than that. About two rails' length beyond that I felt my engine suddenly drop in front on the right. I can't tell much what happened afterwards. I had time to shut off steam and reverse, and to sound my whistle, but I can't remember anything more, except that I found myself on the engine, at the bottom of the bank in the river. We had been running very steadily and evenly. There had not been much slipping. There was a little sleet. I had a snow plough on in front of my engine, but there was no snow on it at the time. I had come with the 9.30 down train from Blair Athole, and there had been a good deal of snow on the Struan bank. The plough had been working all right. After the accident I found that the leading axle of my engine was broken, but can't say whether it was done before or after we left the rails. The ground at the side of the line was very rough and stony. On the 16th February, eight days before this accident, I was driving the same engine as pilot to the 9.30 down train, and the leading axle broke when running between Kincaig and Aviemore. Nothing left the rails upon this occasion. The engine went to the shops, and I had it out again, running with a new leading axle on the 18th or 19th of February. I have had this engine, No. 51, for about three months, and consider it a very smooth-running engine. I didn't hear any crack either when the axle broke on the 16th or on this occasion. My leg was bruised, but very slightly. My engine is a four-wheel coupled engine, trailing and driving wheels coupled, and with 3 feet 6 inches leading wheels. The tender has six wheels with one break-block on each wheel.

John McLachlan, fireman five years, states : I was fireman to Andrew Mackenzie. I felt a slight jerk before we left the rails, but can't say what it was. I was not hurt. The engine ran very rough after we left the rails. I didn't leave the engine till it came to a stand. I don't remember seeing the tender fall over the bank.

James Roff, passenger guard 15 years, states : I was guard to the 10.18 a.m. up mail train on the 24th February, and was riding in the rear van. There were engine and tender, nine fish waggons, post-office van, front break-van, third-class carriage, long composite, first-class composite, and rear break-van. A pilot engine and tender were attached in front at Kingussie. We left Kingussie at 1.8 p.m., 16 minutes late. The accident occurred at 1.27 p.m. We were running 26 to 30 miles an hour, and were rather losing than making up time. There was no sudden increase of speed. I didn't know anything was wrong till I felt the train beginning to slacken speed. I commenced to put on my break, but almost at once my van was off the rails. When we came to a stand my van was about a van's length on the broken-up road. I went back afterwards and examined the road, but could not find anything wrong, except some freshly chipped chairs. There was no obstruction on the rails. The four leading waggons were upset, but the others and the passenger carriages were upright, although all off the rails. There were about 30 or 40 passengers. One man said he was shaken a little, but he has not since made any complaint. I asked the drivers if they could account for the accident, but they could not do so. I was not hurt. It was very hard, but the road had seemed quite smooth.

John Donald Martin states : I was second guard to the up mail, and was riding in the front van, between the post-office van and the carriages. I didn't feel anything wrong until I found my van off the rails. I heard no whistle and didn't apply my break. I wasn't hurt. I examined the road and could find no obstruction.

Thomas Chambers, inspector of permanent way, states : I have charge of a section of 50 miles from Grantown to Dalnaspidal. On the 24th February I was in the rear van of the up mail when the accident occurred. I didn't feel anything wrong till we were off the rails. I was looking out of the window and thought I saw the tender drop off the rails. I called out to the guard "We are off the road," and he ran to the break. I felt only a slight slackening of speed. I had examined this part of the line about a fortnight before, and had since travelled over it every day. One of my men was over it three quarters of an hour before the accident, and found nothing wrong. This length had been relaid in June 1876 with new steel rails. It has been such a hard frost for 16 weeks that it has been impossible to touch the sleepers. Where necessary we have packed up the chairs. This had been done a little way back about ten days ago. I examined the road thoroughly after the accident, and found a mark on the right rail, 151 yards south of the 81st mile-post, where the flange of an engine wheel had mounted the rail. The first mark on the outside of this rail was a chipped chair about 3 feet south of the first mark; the next four chairs were broken, and then the next joint 16 feet south of the first mark was broken. From this point the right-hand rail was torn up for 120 yards, two rails broken and others bent. On left side the first mark was about 12 feet south of that on the right, and there the chair was chipped and cracked on the inside. The sleepers were a good deal marked, and there were marks where the right wheels of the engine had run along over the ends of the sleepers and the ground outside the right rail. I tried the gauge and the cant, and it was as it is to-day. About 35 chairs were chipped and broken on the left side, but the rail was not displaced. I could not see where the train engine ran off, but it must have been where the road commenced to be broken up.

Conclusion.

From the foregoing evidence it appears that the leading or pilot engine of this train, while travelling at a little under 30 miles an hour, suddenly left the rails to the

right-hand side, and, after running for nearly 120 yards, partly outside the right rail, and partly in the 4-foot way, left the rails altogether, and then pitched over the bank into the River Truim, about 25 feet below, where it came to a stand with its leading end in the water, and its trailing end half turned over on the bank.

The coupling between this engine and its tender having been broken, the tender appears to have been pushed out and thrown over the bank, and there were marks where it had turned twice over before reaching the river, in the middle of which it was lying bottom upwards, about 50 yards behind the engine.

The train engine came to a stand at the top of the bank, outside the rails altogether, about 120 yards from the spot where the first mark of a run-off was found, and then turned over, lying half-way down the bank with the wheels in the air, the tender being half overturned at the edge of the bank.

The four leading fish trucks were upset and thrown against the tender and partly over the edge of the bank, but all the other vehicles in the train remained upright, the rear van having just entered upon the broken-up road.

Both the drivers and their firemen remained on their engines, and, considering the nature of the accident, it seems wonderful how they can have escaped uninjured.

The road up to the point where the first mark occurred was in very fair condition, considering that the incessant frost, which had prevailed for 16 weeks, had made it impossible to move the sleepers so as to adjust the levels.

The gauge for 50 yards back was from $\frac{1}{8}$ th of an inch to $\frac{1}{4}$ of an inch slack but tolerably regular, and although the cant varied from as much as $4\frac{3}{4}$ inches to 2 inches near the end of the curve, there were no sudden irregularities. I cannot, therefore, attribute this accident to any fault of the road, and it seems clear that it was due to the breaking of the leading axle of the pilot engine.

This axle was broken at the right-hand side, the fracture being not quite straight across, from a point $\frac{3}{16}$ ths of an inch inside the boss at one side, to a point 1 inch outside the boss at the other.

The metal is of fair quality, but there is an old flaw, extending over about 5 inches of the circumference, and in no place much over $\frac{1}{8}$ th of an inch deep. This flaw is altogether inside the boss of the wheel, and could not have been detected unless the wheel had been removed from the axle, and it is of so slight a nature that it might be thought that it could not have been broken in fair running.

It is, however, a curious fact, and one which leads to the conclusion I have arrived at, that a precisely similar axle, one of the same manufacture and of the same age, broke under the same engine only eight days before this accident, while running between Kincaig and Aviemore, fortunately without causing any accident, the flaw in this case being also a slight one, about $\frac{1}{4}$ of an inch in depth at the deepest part, and extending over about $6\frac{1}{2}$ inches of the circumference of the axle. There can be no doubt that on this line all parts of the rolling stock have this winter been subjected to a very severe strain by the state of the road, which has been frozen hard to a depth of 2 feet, and, unavoidably, in a rougher condition than it should be in a good season, and it is easy to imagine that a slightly flawed axle, which might run safely on a perfectly smooth and elastic road, would fail under these circumstances.

This accident furnishes another proof of the necessity of devising some means of ascertaining the condition of an axle at those parts where it is hidden from observation, either by the removal of the wheels at some stated intervals, or by some other reliable test.

The Secretary, (Railway Department,)
Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major R.E.

APPENDIX.

RETURN of DAMAGE to Rolling Stock in Accident at
Inchlea on 24th February 1879.

No. 51 Engine.

Snow plough smashed; leading axle broken by boss; leading horn plates broken; life guards broken; right leading spring broken; buffer plate and outside frame damaged; one injector broken; one injector bent; left piston rod bent; slide bar top bent; slide blocks broken.

Tender.

Left leading wheel broken off by boss; shifted off frame; requires rebuilding.

No. 64 Engine.

Right outside frame damaged; house damaged; feed pipe, small tank pipe, cocks, and tender back-box damaged.

Third-class carriage, No. 100, right footboard damaged.

Post office, No. 4, step and hanger broken, spindle buffer bent, and cutter wanting.

Fish waggon, No. 1,384, buffer, draw-bar, and coupling broken.

Fish waggon, No. 1,448, buffer, draw-bar, and coupling broken.

Fish waggon, No. 1,473, two buffers broken, break guide wanting, end damaged.

Fish waggon, No. 1,391, both ends damaged, bearing spring broken, and coupling wanting.

Fish waggon, No. 1,388, side and end damaged, buffer wanting.

Fish waggon, No. 1,631, end upright damaged, bearing spring broken, two buffer sockets broken, spindle bent.

Fish waggon, No. 1,384, bearing spring broken and break guide wanting.

D. JONES.

Inverness, 11th March 1879.

Printed copies of the above Report were sent to the Company on the 18th April.

LANCASHIRE AND YORKSHIRE RAILWAY.

SIR,
Board of Trade, (Railway Department,) 13, Downing Street, London, S.W., January 18th, 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 10th instant, the result of my inquiry into the causes of an accident which occurred on the 2nd instant at Accrington, on the Lancashire and Yorkshire Railway.

In this case, as the 5.5 p.m. down passenger train from Salford to Colne, consisting of engine and tender, break-van, and four carriages, was setting back from the down line on to the up line, in order to reach the station platform, the rear vehicle, a third-class carriage, left the rails at the cross-over road points, and struck the parapet of a viaduct, carrying away about 12 yards of heavy stone coping, and about eight yards of the two top courses of masonry, which fell about 30 feet into a stable yard.

No complaints of injury were made by the passengers, and no person was injured by the falling stones.

In the rear carriage a cross-bar, foot-board, steps, and corner of bottom panel were damaged, and in the second carriage from the rear the end panel was damaged.

Description.

Accrington station is situated at the junction of the Lancashire and Yorkshire line from Manchester to Colne and Skipton, running from the south, and that from Blackburn and Liverpool running from the south-west; and there is also a short loop line between these two lines to the south of the junction, forming a triangle.

The junction of the two main lines is named Colne junction, and those at the east and west ends of the loop Manchester and Blackburn junctions.

The station is one-sided, the only platform being situated on the up side of the Manchester line immediately south of Colne junction, the signal-box, which is opposite to the junction points, being on the north end of the platform.

A little further north, on a viaduct known as Burnley Viaduct, there is a cross-over road between the up and down main lines; the trailing points on the up line being 66 yards, and those on the down line 113 yards from Colne junction signal-box.

Most of the down trains from both Manchester and Liverpool run past the station, and are stopped beyond the cross-over road points, through which they are then backed to the station platform on the up line.

These points, which in this operation become facing-points, are not provided with locking-bar or facing-point bolt.

There is a point indicator working with the points, and also a lamp upon the parapet of the bridge, placed there with the object of showing the signalman in Colne junction signal-box when the tail of the train is beyond the points.

The only other signal to which it is necessary to refer is the up home-signal, which is situated 117 yards north of the signal-box, and has four arms, the third of which from the top is the signal for setting back to the station platform, through the cross-over road.

The lever working this signal is correctly interlocked with that working the points.

The line is level through the station, but rises from the junction towards Colne on a gradient of one in 165.

Evidence.

Nathan Borth, driver five months, states: On the 2nd instant I was driver of the 5.5 p.m. down passenger train from Salford to Colne, consisting of engine and tender and five coaches. We arrived at Accrington at 6.15 p.m., right time, ran slowly past the station on the down line at about six or seven miles

an hour, and pulled up beyond the cross-over road points. I waited there for about two or three minutes, and then the semaphore-arm for setting back to the platform was dropped, and I put steam on and commenced to set back. I had got back about the length of my engine when I felt a bit of a jerk, and I shut off steam and reversed my engine. I was just moving at the time. The guard went back to see what was the matter, and found the rear carriage had got off the rails at the cross-over road points. I have driven the same train four or five times before, and have been fireman on the road for six years. I have been back through these points daily, and with the same length of train, and know perfectly well where to stop so as to be clear of the points. I feel sure the tail of the train was over the points. The train was fitted with Fay's break worked by the guard. I think the jerk I felt was the carriage striking the wall.

Thomas Hewitt, passenger guard four years, states : On the 2nd instant I was guard of the 5.5 p.m. down passenger train from Salford to Colne. The train was made up as follows : engine and tender, break-van, and four coaches. The carriages were coupled to the break-van with Fay's break. We arrived at Accrington right time at 6.15 p.m., ran usual speed past the station on the down road, and pulled up when the train was over the cross-over road points. I had no means of knowing that the tail of the train was over the points, except by judging the distance. We waited there about a minute, and then I took off my break. I saw the semaphore-arm dropped for us to set back, but did not see the point indicator. The driver set back at once, and we had moved about a carriage length back, when I felt a jerk. We were moving quite slowly at the time, and the driver stopped at once. I jumped out and went back at once, and found the last carriage, a third-class, off the road on the left-hand side. All the wheels were off, and the trailing end was against the parapet. The carriage was slewed. The trailing wheels were in the position having one wheel against the wall, and the other in the four-foot against the left rail. The leading wheels, one in the four-foot against the right rail, and the other in the six-foot. All the wheels of the second carriage from the rear were on the rails on the cross-over road. The coupling was not broken. There were a few passengers in the rear carriage. I go through this shunting operation daily, in alternate weeks, and I think we had pulled up in the usual place, but have no mark to guide me. My van is sometimes in front, and sometimes behind. When it is behind I find that the tail of the van is generally from one to two carriage lengths' over the points; never less. No carriage that I know has been off in a similar manner here before, but I remember once the signalman signalling to the train to draw forward, I suppose because the tail was not over the points.

William Stevenson, signalman 4½ years, three or four months at Colne junction cabin, Accrington,

states : On the 2nd instant I came on duty at 2 p.m. for an eight hours' shift. At 6 p.m. there was a guard in my box, but he was on duty and authorised to be there. At 6.15 p.m. the 5.5 p.m. down Salford train arrived, and passed my box towards the cross-over road points as usual. When it stopped I saw the lamp on the parapet, which is placed there for the purpose, quite plainly clear of the tail of the train. It was dark, but I could see the lights of the train. I pulled the points over at once, and then took off the signal for the train to set back. I then came back again to the station end of the box to receive some instructions from the station staff, and whilst there, on looking out of the window, I saw something was wrong with the train, and I at once put my signals at danger. This was a second or two after I had set the points and lowered the signal, and I don't think the train had set back above a carriage length. I cannot say exactly how far the tail lamp of the train was clear of the parapet lamp when I saw it. It was not far, and perhaps closer than usual, but I didn't think that the driver could have had time to set back at all between the time I saw the lamp and the time when I pulled over the points. I was standing at the station end of the cabin when I saw the lamp. I generally stand about the middle of the cabin when I look, or at the north end. When I came on duty the points in question were disconnected, under repair, and they were connected up again at about dark, about half-past 4. Between half-past 4 and the time the accident occurred, several engines and three trains had set back through these points, and nothing had gone wrong. I don't remember any instance of an accident at these points when I was on duty, but I understand that there have been an engine on one occasion, and a truck on another, off within the last few weeks. It has happened more than once that I have had to signal to a train to draw ahead to clear the points.

Alexander Smith, foreman plate-layer, states : On the 2nd instant I uncoupled the points of the cross-over road to repair them. I did this because I had received complaints that they were not working well. I looked at them before I uncoupled them, and as far as I could see they were all right, but I did it to satisfy the pointsman. We put in about 30 yards of fresh rods. The stretchers, or four-foot rods, were quite right, and the switches were fitted as close as if they had been rivetted on both sides. I did nothing to them. I tried the gauge both ways, and it was exactly right, 4ft. 8½in. Nothing has been touched there since. I examined the switches after the accident, and there were no marks on them.

Ahaziah Cockshutt, ticket collector, states : I was a passenger in the last carriage of the train to which the accident occurred on the 2nd instant. I did not look out to see where we stopped, but the moment after we began to move back the carriage left the rails.

Conclusion.

From the foregoing evidence it appears that, on the arrival of the 5.5 p.m. down passenger train from Salford at about 6.15 p.m. on the 2nd inst., it proceeded as usual past the station to the cross-over road north of Colne junction, where it stopped. After waiting for about two minutes, on the proper signal being dropped, it set back through the cross-over road points ; but, almost immediately after it had started back, the rear vehicle of the train, a third-class carriage, left the rails on the outside of the main down line, and struck the parapet of the viaduct about 18 yards south of the points, knocking down about 12 yards of the heavy stone coping, and about eight yards of the two top courses of the parapet wall, the debris of which fell into a yard about 30 feet below.

There is no question but that the driver received the proper signal for setting back, which could not be given until the points had been properly set, and the signalman

is quite certain that before he set the points he saw the lamp on the parapet clear of the tail of the train, which ought to have been a proof that the train was beyond the points.

It is however evident from the position in which the carriages were found after the accident, and the course taken by the rear vehicle, that the rear wheels of this carriage had not been properly past the points when they were pulled over, and that, on the train being set back, they took the rails of the down main line, while the front wheels and the remainder of the train followed the cross-over road, and pulled this carriage round off the rails.

In order to test the accuracy of the evidence of the signalman, I had a train placed in such a position that the trailing wheels of the rear vehicle were short of the points, and I found that, although the lamp on the parapet wall was hidden by the train, when looking out of the north end of the signal-box—the usual position of the signalman, yet that on looking out of the window at the south front of the box, which the signalman had done on this occasion, the lamp was just visible. There is no reason to doubt the statement of this man that he did see the lamp, although the train was not properly over the points, and very possibly, as the train was standing on a steep incline, it may have crept back a foot or two in the interval between his sight of the lamp and his pulling over the points.

The points appear to have required adjustment, but had the same morning been put in order, and had since been safely run through by several engines and trains before the accident occurred, and there is no reason to attribute the accident to any neglect on the part of those responsible for the proper maintenance of the permanent way, which I found to be in good order.

I consider, therefore, that no blame can be attached to any of the servants of the Company concerned, but that this accident was due to the wrong position of the lamp on the parapet, to the want of proper appliances at these facing-points, and to the faulty arrangement of the station, which necessitates the performance of this shunting operation.

I am informed that the signalling arrangements at Manchester and Blackburn junctions have been revised lately, and that the Company are only waiting to do the same at Colne junction until the heavier undertaking of altering the station, for which Parliamentary powers have been obtained, and plans prepared, has been commenced.

It is to be hoped that this accident, which might have been a serious one, had not the speed of the train been very slow, and had not the yard into which the debris of the parapet fell been most fortunately empty at the time, will lead the Company to hasten their arrangements for remodelling this station, so often condemned by the Inspecting Officers in their reports upon the frequent accidents which have occurred here; and in the meantime no time should be lost in moving the lamp on the parapet wall about 20 yards further north, so as to leave a greater interval between the tail of a train and the points, before they are pulled over, and also in fitting these points with locking-bar, facing-point-bolt, and gauge tie, which apparatus would in this case have effectually prevented the accident.

In conclusion it should be observed that the train to which the accident occurred was running without a break-van at the rear of the train, which is a practice much to be deprecated.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major, R.E.

Printed copies of the above Report were sent to the Company on the 6th February.

LANCASHIRE AND YORKSHIRE RAILWAY.

Board of Trade, (Railway Department,)
13, Downing Street, London, S.W.,

6th February 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 29th ultimo, the result of my inquiry into the causes of two accidents which occurred on the 16th ultimo at Victoria station, Manchester, on the Lancashire and Yorkshire Railway.

In the first case, as the 5.15 p.m. up passenger train from Royton to Manchester,

consisting of tank-engine, break-van, one second-class, one first-class, three third-class, and one composite carriage, was being let down by gravitation into Victoria station, at about 5.56 p.m., the last two carriages left the rails at the facing-points leading to No. 1 bay line.

There were no passengers in these two carriages, but one of the passengers in this train complained of injury.

One buffer, one side chain, and the step-irons of a third-class carriage were broken.

The only damage to the permanent-way was the bending of a 4-foot stretcher-rod at a second set of facing-points on the line leading to the other bays.

In the second case, the engine of the 5.50 p.m. up passenger train from Staleybridge to Manchester left the rails, about half an hour later, at the points which were damaged by the first accident.

No passenger in this train complained of injury.

The life-guards of the engine were broken.

Description.

About 85 yards east of the east end of Victoria station, Manchester, the old Lancashire and Yorkshire main line from Miles Platting is joined by a new loop line, which approaches from a northerly direction on a sharp curve, the facing-points being on the down line. This junction is worked from No. 1 signal-cabin, containing 37 working levers, and situated at the end of the station platform, about 80 yards west of the junction.

About six yards west from the junction of the loop line there is a connexion on the up main line, with facing-points, No. 28, leading to No. 1 bay, and 27 yards further west on the up main line is another set of facing-points, No. 25, leading to Nos. 2, 3, 4, and 5 bays. A third set of facing-points, No. 21, 23 yards further west, leads from the line for these bays into No. 1 bay, and a fourth and fifth set, Nos. 20 and 19, close to the signal-box, lead from this line into No. 5 and No. 4 bays. Trains from the loop for No. 1 bay can either go through No. 28 facing-points, or past these points on the main line and through Nos. 25 and 21 points, and trains for No. 4 bay pass No. 28 points, and go through Nos. 25, 21, and 19 points.

The line from the loop falls on a gradient of 1 in 60 towards the station.

The home-signal for the bay lines off the loop is situated 107 yards outside the junction, and there is also a disc-signal there worked from No. 1 cabin, and used for giving permission to engines to run forward when detached from their trains, which are then let down into the station by gravitation.

Evidence.

John Irwin, signalman 12 months, states:—On the 16th of January I came on duty at 2 p.m. in No. 1 cabin, Victoria station, for eight hours. At 5.55 p.m. the 5.15 p.m. up passenger train from Royton to Manchester arrived on the branch, and stopped in the usual place at the home-signal. The engine was detached as usual, and came forward on the main line, the disc-signal for this operation being properly turned. As soon as the engine was clear over No. 25 points I prepared the road for the passenger train to run into No. 4 bay, through Nos. 28, 25, 21, 20, and 19 points, and lowered the proper signal worked by No. 38 lever. As soon as the front vehicle of the train, the guard's van, was upon No. 21 points, I put No. 38 lever back to "danger," and immediately I had done so I put back No. 29, working the locking-bar of No. 28 points, supposing that the whole train was past these points, and at the same time I pulled over the points. I did this so as to lose no time in letting the engine go back along the main line through the cross-over road, and up the loop again. The two rear carriages of the train left the rails and blocked both main lines, remaining coupled together. I am not aware that any alteration has been made to the locking-bar of No. 28 points since the accident. It had been working all right. There are no special instructions as to when the home-signal is to be put back to "danger," but I never do put it back until the train has passed the facing-points. I am certain that upon this occasion the train was past No. 28 points before I put the home-

signal back to "danger." I cannot in any way account for the accident. I moved the point lever immediately after the locking-bar lever and the home-signal lever. I didn't leave my signal-box after the accident, and didn't go and examine the points afterwards. At about 6.20 p.m. the engine of the 5.50 p.m. Staleybridge train ran off at No. 21 points. This train had to go into No. 1 bay, and although one train had gone through No. 21 points since the accident, it was for another bay line, for which these points lie right in their normal position, so that these points hadn't been pulled over since the accident. I am certain I could not have pulled over the facing-points, with the train on them, without feeling it.

John Crabtree, driver eight years, states:—On the 16th of January I was driver of the 5.15 p.m. up passenger train from Royton to Manchester. I brought my train to a stand at the usual place on the new loop line outside the home-signal, and, after unhooking the engine, went down the straight road, and stopped until the line was clear for me to set back and go to the engine shed. As soon as I was clear over the points they were set for the train, and it was let down in the usual manner. It seemed to enter the station all right, and I didn't notice anything unusual until I heard a noise like the application of the breaks, and on looking round I saw that the two last carriages had left the rails at No. 28 facing-points.

William Wild, passenger guard four years, states :—On the 16th of January I was guard of the 5.15 p.m. Royton train, consisting of tank-engine, break-van, one second-class, one first-class, three third-class, and one composite carriage. The five front carriages were coupled to my van with Fay's break, and the two rear carriages were free. On arrival at the up home-signal on the loop-line the engine was unhooked and ran forward as usual, and as soon as the proper signal was lowered, I let the train run forward to enter the station, at from four to five miles an hour. I didn't see the home-signal put back to danger after I had passed it. I didn't stop my train at all after I started it, but checked it round the corner to come into the station. I didn't examine the points after the accident. I often let down trains in this manner, and believe it is done with 60 trains a day. I do not remember any previous accident occurring during this operation.

Thomas Savin, main line inspector, states :—It is my duty to regulate the entrance of trains into the station, and to communicate between signalmen and drivers during shunting operations. The train due at Manchester from Royton at 5.55 p.m. consisted of five carriages coupled to break-van, and a loose third-class, and loose composite, the latter being the rear, and the break-van the front vehicle. I was in No. 1 cabin getting tea when the train arrived. The signalman, as soon as the accident happened, expressed surprise, and when he did so I looked at the levers. No. 29, the locking-bar lever, was back as well as No. 28, the facing-point lever, and No. 27, which works the cross-over road, was partly over. I at once went down to the spot and found the third-class carriage was right across the road leading into the station. The inside side chain was broken, but the other side chain remained coupled. The last carriage was also off the rails, and the two together were in the shape of the letter V. I immediately examined these two carriages and found that there were no passengers in either of them. No passengers in the train complained of being hurt. I at once commenced to get the carriages on to the road, and got the road clear at 6.16, or 20 minutes after the accident occurred. I noticed that one 4-foot rod of No. 21 points was a little bent, but the points fitted closely, while set for Nos. 2, 3, 4, and 5 bays, their normal position. I didn't examine them when set the other way for No. 1 bay. The two carriages off the rails came to a stand between Nos. 21 and 20 points, about a dozen yards from the signal-box.

John Leyland, driver five years, states :—On the 16th January I was driver of the 5.50 p.m. up passenger train from Staleybridge to Manchester. On entering Victoria station I felt a sudden shock as if the leading wheel had struck something, and this proved to be the nose of the points leading to No. 1 bay siding in which it was intended to place the train. I was going quite slowly at the time, and came to a stand immediately. I found all six wheels of my engine were off to the right-hand side, and the trailing wheels of the carriage next to the engine were also off. The only damage to my engine was the bending of the life-guards. We were not going more than four miles an hour when we struck the points.

John McNulty, station-master at Victoria station, states :—After the first accident occurred on the 16th January I was on the spot. When the carriages had been got on the rails I examined the road, and as all the points appeared to be in good order, the 6 p.m. train for Rochdale was despatched, and some empty carriages shunted out from No. 1 bay. The Ashton or Staleybridge train due here at 6.20 p.m. was signalled from No. 2 cabin at 6.22 p.m., and when passing No. 1 cabin at 6.31 p.m. the engine came off the road at No. 21 points, which were set for No. 1 bay. The leading wheels of the engine

took the straight road, which leads to Nos. 2, 3, 4, and 5 bays, while the other wheels followed the right rails for No. 1 bay. All wheels left the rails, and the trailing wheels of the next carriage, a third-class, were also pulled off. In the first accident the end of the third-class carriage was thrown against an engine which was standing in the stable siding, and a buffer and step irons were broken. In the second accident the life-guards of the engine were broken. A female passenger, hawking earthenware, was a passenger in the Oldham or Royton train, and she complained that she was shaken and that some of her ware had been broken. I am of opinion that the two rear carriages in the Oldham train left the metals at No. 28 points leading to the stable siding, and that these points had been unlocked and reversed while the train was passing over them. They were however apparently in good order on being examined after the accident. I examined No. 21 points after the first accident, and they appeared perfectly safe for a train to travel over them. They were lying in their normal condition when I examined them, and I did not examine them when lying in the other position. The Rochdale train passed over them in a trailing direction after the first accident, and some empty carriages in a facing direction, on being shunted from No. 1 to No. 5 bay.

James Taylor, foreman platelayer, states :—At about half-past 4 p.m. on the 16th January I examined all the points worked from No. 1 cabin, Victoria station. They were all in good order. I examined the locking-bar of No. 28 points. It was standing up all right close to the rail. I did not see it worked. At about five minutes past seven on the same evening I was sent for. I examined the points again, and No. 28 points were all right. I found the 4-foot rod at No. 21 points bent, so that the switches would not fit at either side. No chairs were broken. I afterwards examined the locking-bar at No. 28 points, and could see nothing wrong. It has been repaired since the accident. I do not know what has been done, but they had been strained when being tried with a train passing over them. The bar was fitting close. I tried to put in my finger, but could not do so. There was no mark of a flange having got between the bar and the rail. I am certain it could not have got in. If the bar had been in such a state as to allow it to do so, I would have been to blame for not having it put right. The only damage to the permanent-way from either accident was the bending of the 4-foot rod at No. 21 points. I examined the locking-bar at No. 28 points on the following day, after inspector Taylor had tried it, and it was not damaged. No castings were broken.

Henry Taylor, travelling inspector of signal-cabins, states : On the 17th of January I examined the facing-points where the accident had occurred on the previous day. The locking-bar was in a good state and fitting well. I then tried the lever working the bar when a train of empty carriages was running over them at about six miles an hour. I found I could quite easily put back the lever. I did it the first time I tried it. I examined the bar afterwards and could see nothing wrong with it. It did not seem to be strained.

R. Ogden, signal-fitter, states : On the morning after the accident my attention was called to the locking-bar of points No. 28 (after inspector Taylor had been trying an experiment), and on examination of it I found that the cast-iron clip which supports the locking-bar at the east end, that is, the furthest from the signal-cabin, was broken. I was told that inspector Taylor had got the bar over between some carriages. The bar was very little strained, but the cranks were all strained. I put it in thorough working order on that day. The locking-bar was bent from the rail at the east end, and I account for

this as being caused by a twist of carriages in coming off the loop-line, and it is my impression that the flange of the carriage wheel had got between the rail and the locking-bar and forced it over, and that the bar would spring back towards the rail after the wheels had left it.

Conclusion.

From the foregoing evidence it appears that, as the 5.15 p.m. up train from Royton was being let down into Victoria station, the engine having been detached and run forward, the signalman in No. 1 signal-cabin, anxious to lose no time in making ready the road for the engine to go back up the loop, put back his home-signal to "danger," and unbolted and pulled over No. 28 facing-points, before the tail of the train had cleared them, and consequently threw the two rear carriages off the rails.

He states that the leading vehicle of the train had arrived at No. 21 points before he put back his signal, but he is probably mistaken, and, even if this were the case, he ought to have known that there was not room between the two sets of points for the whole train.

He also states that if the tail of the train had been still on the points he would have been prevented by the locking-bar from unbolting and reversing them, but in this also he proves to be mistaken, for it appears that the signal inspector in trying the experiment succeeded in doing so at the very first attempt, without any difficulty.

The locking-bar is only 16ft. 4 in. in length, and 4 inches at each end slope down, so that the effective length cannot be taken at more than 15 ft. 10 in. at the outside.

The wheel base of the two vehicles which immediately preceded those which were thrown off is 16 feet, so that it was quite possible to put back the locking-bar between the wheels while one of these vehicles was passing over it.

It is also not improbable that on coming off the curve on to the main line, the flange of the left trailing wheel of one of these vehicles, which would be grinding against the left rail inside which the locking-bar is placed, may have got between the rail and the locking-bar if these were not fitting very closely together, and so the operation of putting back the bar may have been facilitated.

The accident to this train was therefore due—first, to the fault of the signalman in No. 1 signal-cabin in shifting No. 28 facing-points before the whole of the train had cleared them, and secondly to the insufficient length of the locking-bar at these points, which allowed of his doing so.

The second accident, in which the engine and one carriage of the 5.50 p.m. up train from Staleybridge left the rails, was due to the straining of the stretcher-rod of No. 21 facing-points by the first accident, and I consider that both the station-master and inspector Savin are to blame in not having had these points examined in their reverse, as well as in their normal position before trains were allowed to run over them.

I would recommend that a locking-bar of greater effective length than the wheel base of any of the Company's carriages should be fitted to No. 28 points, being placed outside the rail if sufficient room cannot be obtained inside.

Additional safety would also be secured if the signalman could be mechanically prevented from releasing the locking of the lever which works the locking-bar, after trains have passed the home-signals, and he has replaced these signals to danger. The provision of an additional stop-signal close to the points, and interlocked with the locking-bar, would meet the case. This signal should also be so interlocked that it must precede one or other of the existing home-signals.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major, R.E.

Printed copies of the above Report were sent to the Company on the 5th March.

LANCASHIRE AND YORKSHIRE AND LANCASHIRE UNION JOINT RAILWAY.

SIR, Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 5th March 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 10th of February, the result of my inquiry into the causes of a collision which occurred at Feniscowles station,

on the Lancashire and Yorkshire and Lancashire Union Joint Railway, on the 27th of January.

In this case, as the 12.45 p.m. Lancashire and Yorkshire down passenger train from Wigan to Blackburn, consisting of tank engine and four carriages, of which the rear one was a third-class with break compartment, was approaching Feniscowles station at 1.38 p.m. it came into collision with the tail of a London and North-Western down special goods train from Park Lane to Blackburn, consisting of engine and tender, 16 loaded waggons, and break-van, which was running slowly ahead on the same line.

One passenger complained of injury.

None of the vehicles left the rails, and the only damage to the rolling stock was to the break-van of the goods train, in which the rear head-stock, stove pipe, two windows, and one lamp were broken.

Description.

Feniscowles station is 6 miles 51 chains north of Chorley, on the Lancashire Union line between Chorley and Cherry Tree junction for Blackburn.

The intermediate signal-boxes are at Heapey, Brinscall, and Withnell stations distant south from Feniscowles, 4 miles 28 chains, 2 miles 61 chains, and 1 mile 48 chains respectively.

The line is double, and one of heavy gradients and sharp curves, falling the whole way from Withnell to Feniscowles.

On approaching the latter station the line is straight, and on a falling gradient of 1 in 100 to a point about 570 yards south of the station, and is then level through the station, a distance of 660 yards, being on a 60-chain curve for 280 yards, and then straight for half a mile beyond the station.

The point of collision was 210 yards south of the station signal-box, which is situated at the south end of the up platform.

The down stop-signal is 245 yards, and the down distant-signal 1,069 yards south of the signal-box, from which, when some sidings on the up side of the line are full, as was the case in the present instance, the engine of an approaching train is not visible until it arrives within a distance of 120 yards.

The tail of a train standing at the point of collision is visible from the engine of an approaching train for 427 yards, through the arch of an overbridge situated 609 yards south of the signal-box.

This line is not yet provided with appliances for block telegraph working, and the usual rules under such circumstances are in force, prescribing that no train must be allowed to follow any other train within five minutes, that until an interval of 10 minutes has elapsed, following trains must be stopped and sent forward with a caution, and that a goods train must be shunted out of the way of a passenger train "at least 10 minutes before such passenger train is due."

Evidence.

John Hull, signalman five years, states : On the 27th of January I came on duty at Brinscall at 6 a.m. for 12 hours. The Platt Lane coal train passed my box at 1.24 p.m. It is due at 11.50 a.m., but is not a daily train, running only when required. It was running usual speed. The Lancashire and Yorkshire down passenger train from Wigan to Blackburn, viâ Horwich junction, passed at 1.32 p.m. It is due to pass at 1.30 p.m. It was not going any faster than usual. It had stopped at Brinscall. According to the rules I must keep my signals at danger until a train has passed at least five minutes. Up to 10 minutes interval the driver must be cautioned. I showed the driver the caution-signal, a green flag, and also indicated to him that the coal train was five minutes in front of him. I know rule 166 lays down that goods trains are to be shunted when less than 10 minutes ahead of passenger trains. I did not do so on this occasion because I knew that the goods train was not going to stop before Blackburn, and I thought there was plenty of time if it had run at its usual speed, knowing that the passenger train had to stop at Withnell to collect tickets. It was not a very big load.

Robert Critchley, station-master at Withnell, states : The coal train passed at 1.30 by the station clock, running slowly, but not slower than usual. The

passenger train due to leave at 1.35 left right time by the clock. The driver was cautioned by one of the porters that the coal train had just gone in front. He told him so but did not say how long in front. There is a home-signal with an arm for up and down road, and a distant-signal in each direction. There is no special signalman, but the signals are worked by one of the porters under my direction. I consider that I am responsible for them. My clock was set right that morning. I know that under rule 166 goods trains must be shunted for passenger trains, when less than 10 minutes ahead of them. I did not do so in this case because I did not know that the goods train was coming until I saw it approaching. It was then between 100 and 200 yards off, and as it was a heavy train, and on an incline of 1 in 60 I knew I could not stop it until it had run past the sidings, and it would have had to set back. It was running 25 miles an hour.

Thomas Crompton, porter five years, states : I was on the platform at Withnell when the goods train passed. It was running very steady. I cannot say exactly how fast, but not much faster than I could run, not over 12 miles an hour I should say. I was on the platform when the passenger train started. I told the driver that a coal train was just in front of him, that it had just left. The goods train left at 1.30, and the passenger train at 1.35.

Joseph Goodwin, station-master at Feniscowles, states: On the 27th January I was in the office when the accident occurred. Charles Holland is the porter who usually looks after the signals. He is not signalman, but when he is in the cabin I consider him responsible, when he is not in the cabin one of the other men (goods porters) looks after them. There is no rule that when Holland, the only passenger porter, leaves the signal-cabin he is to put some one else in charge. Sometimes I go myself. When I left my office it was exactly 1.38 by my clock, which was right time. I found the goods train moving slowly past the station, the engine being just past the office. It was just moving. The signals were all on. I did not hear the collision, but went out with the intention of shunting the goods train. I then found that the passenger train had come into collision with the tail of this train just by the first down stop-signal. No vehicle in either train was off the rails. There was no damage whatever to the passenger train, but the two rear vehicles of the goods train were uncoupled, and the rear van was damaged. Head-stock, stove pipe, two windows, and lamp broken. The men with the passenger train told me that all signals were off. Porter Woodruff told me that he put the distant-signal up as soon as he saw the goods train. He said this was at the points about 100 yards from the station. No passengers complained to me. There were about 12 passengers, and I hear that one complained afterwards, having had a tooth knocked out.

Charles Holland, porter five years, and two years at Feniscowles, states: I am the passenger porter at Feniscowles, and am in charge of the signals during the day time,—under the directions of the station-master on the 27th January. I had gone to the closet at about 1.30. Porters Woodruff and Leed were in the cabin getting dinner. I did not tell them to look to the signals, but I expected one of them to do so as is the custom.

William Woodruff, goods porter two years, states: On the 27th January I was in the cabin getting my dinner. I had just finished when Holland went out. He did not say where he was going, and did not tell me to take charge; but it is the custom in such cases for whoever is in the cabin to put up the signals if necessary. I saw the goods train approaching very steadily, just as the engine had got to the main crossing. The sidings were full and I could not have seen it further off from the cabin. Directly I saw it I put the down distant-signal up. Within a minute the collision occurred, so that the passenger train must have been past this signal at the time. I put the other signals up when the collision occurred.

Peter Battersby, London and North-Western Railway goods driver 14 years, states: On the 27th January I was driver of the London and North-Western Railway 9.30 a.m. goods train from Park Lane to Blackburn, consisting of engine and tender, 16 loaded waggons, and break-van. We got delayed and did not leave Chorley till within a few minutes of 1 o'clock. My train is not a timed train, but a conditional train. It should, however, leave Chorley at 11.30. I did not make any alteration in my running, and came as usual very steadily down the inclines, in

order to be prepared to stop and shunt if required to do so. My ordinary speed is about 20 miles an hour, but I reduce on passing through the stations. My steam was off on approaching Withnell and breaks on, and I went past the station at not more than 10 miles an hour. When I was approaching it I had expected to be stopped and shunted. I went steadily on to Feniscowles. I did not take more time than usual on the journey. When I was 30 or 40 yards on the south of the signal-box I felt a slight shock and on looking round saw that the passenger train had run into the tail of my train. I was running about 10 miles an hour at the time. The signals were all right, but I expected to be stopped to shunt. I pulled up as soon as I could. The down distant-signal at Withnell was off for me, but I could have pulled up all right if the home-signal had been thrown up against me. With the load I had I could easily have backed my train.

John Clayton, Lancashire and Yorkshire fireman 11 years, states: On the 27th January I was fireman to the driver of the 12.45 p.m. train from Wigan to Blackburn, who is sick and unable to attend. The train consisted of tank engine, running engine first, and four coaches, the rear one being a third-class break. The engine, No. 345, is a 4-wheel coupled bogie engine, fitted with steam break working one block on each of the eight wheels. The train was fitted with Fay's break, worked from the break compartment. We left Withnell at 1.36, according to my watch. The porter came and cautioned us that the goods train was gone in front of us, but he did not say how long. We came at from 25 to 30 miles an hour down from Withnell with steam off. When we came in sight of the down distant-signal at Feniscowles it was off, and still off when we passed it. I had also seen the home-signal a little further back and it also was off, and both were off when the collision occurred. My mate called the station-master's attention to it. As soon as we came round the curve through the bridge we saw the goods train in front of us, not above 70 or 80 yards. We were then running from 25 to 30 miles an hour. The driver applied the steam breaks at once, and whistled for the guard's breaks. The engine was reversed. I felt the guard's breaks go on. I should think we had reduced to 12 or 14 miles an hour when we struck the goods train. We were not knocked down or hurt in any way. No one was on the engine with us. I should think the place where we struck the train was about 100 yards from the bridge.

Benjamin Hartley, Lancashire and Yorkshire passenger guard four years, states: On the 27th January I was guard to the 12.45 p.m. down passenger train from Wigan to Blackburn. On approaching Feniscowles I heard the break whistle just as my van was under the bridge. We were running our ordinary speed, and had been doing so all the way down. We are not timed to stop at Feniscowles. I applied my break at once, and it acted well. I was not hurt by the collision. One passenger complained of being injured. The signals were off when we were approaching the station, and the home-signal was put on after the collision. I did not see the distant-signal. The driver and fireman were quite sober.

Conclusion.

This collision might have been prevented by proper attention being paid to the rules of the Company by either the signalman at Brinscall or the station-master at Withnell.

The former ought not to have allowed the goods train to start from Brinscall only six minutes before the time that the passenger train was due, and the latter ought to have stopped the goods train at Withnell in order to shunt it for the passenger train. The excuses made by both these men are of little value, and it cannot be too strongly impressed upon them that the rules laid down for their guidance, with which they acknowledge that they were perfectly well acquainted, are to be strictly and literally complied with, and are not to be set aside at their discretion.

The engine-driver of the Lancashire and Yorkshire train is also decidedly to be blamed for running at so high a rate of speed down a steep incline on a line with many curves, when he had been duly cautioned that the goods train had left Withnell only five minutes before him.

Judging from the time taken to run between Withnell and the site of the accident, and from the fact that, even with the help of a continuous break, he was unable to stop his train within an available distance of 400 yards, it is clear that he was running over 30 miles an hour on approaching Feniscowles station.

I am glad to learn that the Company had decided two months before the date of this accident at once to extend to this line the block system, which, if properly worked, would render the occurrence of an accident of this nature impossible, and that the plans for the necessary re-arrangement of the signals have been prepared.

Until this work has been completed, and proper signalmen appointed, it is desirable that the existing signal arrangements should be worked more systematically, for, from the evidence in this case, it is difficult to determine who is the person really responsible for the state of the signals at some of the stations.

I have, &c.,

The Secretary,
(Railway Department,)
Board of Trade.

F. A. MARINDIN,
Major R.E.

Printed copies of the above Report were sent to the Lancashire and Yorkshire and the London and North-Western Railway Companies, and the Lancashire and Yorkshire and the Lancashire Union Railway Companies Joint Committee on the 26th March.

LEEDS JOINT STATION.

Board of Trade, (Railway Department,)
13, Downing Street, London, S.W.,
29th January 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the Order of the 8th instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 5th instant, at Leeds new station, between a North-Eastern Company's passenger train and some empty carriages belonging to the London and North-Western Company.

In this case, as the 6.45 p.m. North-Eastern Company's (Sunday) passenger train (consisting of engine, tender, and nine vehicles, including two break-vans with a guard in each) from Thirsk for Leeds, where it was due at 8.40 p.m., was entering the new station, it was, owing to the unknown absence of a set of facing-points, turned along a goods line instead of along the line leading to the platform, and came into collision with some empty carriages belonging to the London and North-Western Company.

Three passengers have complained of injuries, not, it is believed, of a serious nature.

The smoke-box of the engine was damaged, and also three empty carriages, two of which were knocked off the rails.

Description.

The alterations which had been for a length of time in progress at Leeds new station had on Sunday the 5th instant been so far completed that the new signal-cabins (four in number) had been brought into use on that day, the new signals, and—as far as possible—the points having been connected with the levers in the cabins; the facing-points (No. 3) at the junction of the incoming main and goods lines had been so connected with the canal cabin; and to admit a train on to E line (leading to the main platform) by means of No 9 signal, the signalman had to set No. 35 points for the goods line, it having been supposed and intended that another set of facing-points (No. 39), not yet connected with the cabin, but spiked, would turn the train from the goods line on to E line. Instead, however, of No. 39 points having been put in upon the goods line, they had, through an oversight, been placed upon the next adjoining line to the north, still leading to line E, but not on the path of the incoming train after it had been turned through points No. 35. Before darkness set in, the divisional engineer and other superior officers of the Company had walked over the ground to see that the arrangements had been properly completed, and they noticed particularly (forgetting

that No. 35 points would, owing to the interlocking arrangements, have to be shifted from their normal position) that the road for an incoming train to line E appeared to be correct, as indeed it was until the necessary movement by the signalman of No. 35 points, prior to lowering signal No. 9, altered the state of the case. It having been Sunday, the train which met with the collision was the first which had entered the station after the new cabins had been brought into use. The collision occurred about 100 yards inside the supposed position of the points, and perhaps 300 yards from where the train would have stopped at the platform.

Evidence.

1. *William Roberts*, in charge of the signalling arrangements at Leeds new station for the firm of McKenzie and Holland.—The new points and signals at Leeds new station were brought into use for the first time on the 5th, and I had been all day on duty superintending the necessary work. Facing-points No. 39, forming the junction between C and E roads, were a new set of points, upon which a gang of men were at work the whole day. I observed the work in progress, but did not notice that the points were being put in upon D road instead of upon E, and I did not find out that the mistake had been made until after the collision, no train or engine having entered the station on this line since the breaking up of the roads had been commenced at about 7 o'clock in the morning. The points in question were not at that time connected with the canal cabin, but were intended to have been spiked over for E road. Points 35 had been connected with the cabin during the day. No. 9 signal was the one which the driver received for coming in, all signal connections having been made. I had seen that the signals and such points as were worked from the cabin were properly coupled. From the points No. 39 to the place of collision was about 100 yards.

2. *James Atkinson*, superintendent of permanent way under the divisional engineer of the southern district, and in charge of the alterations at Leeds new station.—I commenced making the necessary changes in the different lines on the morning of the 5th, at about 7 o'clock, with about 70 men. I myself superintended the putting in of No. 39 points, and by an oversight put them in on D road instead of on E road, just opposite where they should have been. Mr. Copperthwaite, the divisional engineer, was present during the whole day, and we left work at about

5 o'clock, everybody believing the connections had been properly made, and no one discovering the mistake till after the collision. I have been furnished with a proper plan showing the position in which the points should have been.

3. *Arthur Deans*, driver 12 years.—I was driving the 6.45 p.m. passenger from Thirsk for Leeds. The train consisted of engine and tender (running engine first), and nine vehicles, including two vans with a guard in each. No continuous break, but a break on the engine as well as on the tender. We kept time to Holbeck, but were detained at the Midland junction. On approaching the canal cabin I got the second signal from the right, which I expected would have taken me to E road. I was running at a speed of four or five miles along, as I thought, road E when I saw a few yards in front of me some empty carriages. Steam was shut off at the time, and I was able just to apply the engine-break before we struck. My mate had no time to apply the tender break. We knocked the carriages forward a few yards. There was no one about at the time. We were neither of us hurt, nor did we jump off. We were alone on the engine. The collision occurred at 8.41 p.m.

4. *George Blinkhorn*, signalman six years.—I came on duty at 5 p.m. for the first time in the new canal cabin. I was acquainted with the new signals, and I intended to turn the North-Eastern train from Thirsk upon the E line by lowering No. 9 signal, for which purpose I had to pull several point-levers, but was not aware which were connected and which were being worked from the ground. I did not know that anything was wrong with the train, which passed the cabin at six or seven miles an hour, till somebody came to inform me of the collision.

Conclusion.

This collision between the 6.45 p.m. passenger train from Thirsk and some empty carriages was entirely due to an oversight, which had been made on the morning of the day, in the position of a set of facing-points that should have been placed on the line along which the passenger train was running, so as to have turned it on to the line leading to the main platform; but from a mistake of the superintendent of the permanent-way, a man of great experience, (which mistake had not been discovered by any of the superior officers of the Company who had been on the ground during the whole day,) these points had been put in on the line next north of that on which the train was running, and their absence consequently allowed it to continue its course along the goods line until it came into collision with some empty coaches; the driver not perceiving where he was running until too late to stop in time to avoid the collision.

It is only right to mention, that in carrying out the very extensive and complicated alterations in changing from old to new arrangements, both now at Leeds new station and recently at York, the present is the only accident which has occurred.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above Report were sent to the North-Eastern and the London and North-Western Railway Companies on the 22nd February.

LONDON AND NORTH-WESTERN RAILWAY.

SIR, Railway Department, Board of Trade,
13, Downing Street, London, S.W., 31st January 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 17th instant, the result of my inquiry into the causes of a collision which occurred on the 10th instant at New Street station, Birmingham, on the London and North-Western Railway.

In this case, as the 4.15 p.m. up passenger train from Liverpool, 6.6 p.m. from Stafford, consisting of engine and tender, six carriages, and break-van, was entering New Street station, on the London departure line, it struck an engine which was standing on this line, and caused it to move forward into collision with the tail of the 7.10 p.m. passenger train from Birmingham to Walsall, which was standing a little further south on the same line, preparing to start.

Two passengers are returned as being injured, one of whom was in the Walsall train, and the other one, standing on the platform, was struck by an open door in this train.

The buffer castings on the engine of the 4.15 p.m. train were broken, but there was no other damage either to rolling stock or permanent way, and no vehicle left the rails. Three vehicles in the train were fitted with Clark and Webb's chain-break.

Description.

Through New Street station there is an up platform line and an up through line, in addition to bay lines.

The up London departure platform is 281 yards in length, and the points connecting the two up lines are 48 yards north of the down or north end of this platform.

The Birmingham north signal-box is 42 yards further north, and 44 yards beyond is the south end of a tunnel, which is 880 yards in length.

The only up signal worked from this signal-box is a lamp in the tunnel about 360 yards from the box, and there is also a bell signal, worked by passing trains, 365 yards within the tunnel, which is for the purpose of indicating to drivers their position when approaching the station.

The up line is worked on the absolute block system up to the north box, and the entry of trains into the station is controlled by an electric gong code from a signal-box placed at the north end of the platform.

Sheepcote Lane signal-box is 1,300 yards north, and Monument Lane signal-box is 1,857 yards north of Birmingham north box.

The line falls towards the station through the whole length of the tunnel, 880 yards, on a gradient of 1 in 76, but from the north box it is level.

The engine which was first struck was standing close to the points of a cross-over road between the two up lines, 198 yards from the north end of the platform; and the tail of the Walsall train was only two or three yards further south, the engine of this train being nearly opposite to the south end of the platform.

The following rule is in force:—

“Trains entering New Street station, Birmingham.”

“All trains emerging from either the north or south tunnels should be completely under control, so that they can be stopped at any part of the platform.

“Guards must attend carefully to the break, and work it in such a manner as to assist the driver to the utmost. They must be very cautious about taking the break off before the train is quite at a stand.”

Evidence.

George Durham, passenger driver 21 years, states:—On the 10th instant I was driver of the 6.6 p.m. up passenger train from Stafford to Birmingham, where we were due to arrive at 7.5 p.m. We left Dudley Port at 6.53, about six minutes late, and found the signals right for us all the way, though I had to slacken at Harborne junction. The home-signals at Monument Lane and Sheepcote Lane were off, and the signal in the tunnel was showing

white, which signified that all was right to run into the station. Our directions are to approach the station, at either end, at such a speed as to be able to stop at any part of the station. I had passed Monument Lane at about eight or ten miles an hour, not quite so fast as usual, as I had been slackened at Harborne junction. I came out of the tunnel at not more than five miles an hour, and I was prepared to stop at the usual place at the platform. When I got

to the points leading to the London departure platform line, I found that I was not pulling up as fast as I ought to, and I therefore pulled the cord to apply the patent break, and reversed my engine, getting steam against her. I had shut off steam at Harborne junction. My tender break was on tight all the way down through the tunnel. The wheels were skidding. I didn't ease my tender break at all. I never felt any check whatever from the patent break after I had applied it. The guard told me afterwards that he had applied it before I did. We didn't stop in time to avoid running into a light engine which was standing at the departure platform behind a local train, the 7.10 p.m. to Walsall and Derby. We drove the engine slightly ahead, and it struck the other train. The buffer castings on my engine were broken. My train consisted of engine and tender, six coaches, and break-van in rear. My engine is a 4-wheel-coupled engine, driving and trailing wheels coupled, with a 6-wheeled tender, having one wooden break block on each wheel. There were three carriages in the train connected with patent break, two at the rear of the train, and one at the front. I didn't look at the break blocks after we stopped. I got no hand-signals on approaching the platform, but I was aware that the engine and the local train would be standing where they were in their usual place, and that I ought to stop behind them. We had no difficulty in stopping at Wolverhampton or at Dudley Port. I didn't use the patent break at these places, but I tried the cord at Stafford and it was working properly. The bell signal in the tunnel was in proper order. It was a frosty night, but the rails in the station were greasy.

Henry Farren, passenger guard seven years, states :—On the 10th instant I was guard of the 6.6 p.m. up passenger train from Stafford to Birmingham, that is the 4.15 p.m. from Liverpool. We were due to arrive at Birmingham at 7.5 p.m. We were six minutes late in leaving Dudley Port. We came past Monument Lane and Sheepcote Lane the same speed as usual; no faster I am certain. After coming out of the south end of the tunnel the speed seemed to increase rather than decrease. My hand-break had been on at the other end of the tunnel, and it was

acting all right. When I found we were not pulling up as fast as we ought, I applied the patent break. It didn't seem to make any difference. I heard a porter on the platform saying that we were going into the engine, just as I was preparing to get out. I felt no shock whatever, but on getting out found that we had struck a light engine which was standing behind a local train. We were not going above three miles an hour at the time. No one made any complaint to me of being hurt. The only damage to my train was the breaking of the buffer castings on the engine. It was a frosty night but foggy, and the rails were very greasy. The driver was quite sober, and there was no one on the engine but himself and his fireman. The break cord had acted all right at Stafford. It had not been used on the way. I didn't look at the breaks afterwards.

William Murray, chief station inspector, states :—I was standing on No. 3 platform at New Street at 7.8 p.m. on the 10th instant. The local train for Walsall and Derby, due out at 7.10 p.m., was standing at the south end of the platform, in its usual place. About two yards behind it was a light engine, waiting, in its usual place, to be attached to the 7.15 up train for London. The 6.6 p.m. train from Stafford arrived at 7.8 p.m., three minutes late, and ran up to the platform, apparently at its usual speed. I was standing close to the light engine. The Stafford train, which I had seen approaching for nearly 200 yards, didn't seem to check its speed at all, but struck the light engine while going from five to six miles an hour. It drove it forward on to the Walsall train. The carriages in this train were driven forward; but the engine was not moved. I didn't see anyone knocked down, nor did anyone complain. People were standing alongside the train, but not very many. I didn't examine the breaks on the Stafford train, and can't say whether they were on or not. The driver told me he couldn't account for the accident. It is not usual to have to use the patent break to stop here. The light engine was standing in its usual place. When the Stafford train arrives the engine is taken off through the cross-over road, and this engine is attached to take the train on.

Conclusion.

From the foregoing evidence, and the result of an examination of the site, it appears that this slight collision was due to the driver of the 4.15 p.m. up passenger train not being sufficiently careful to obey the rule, that all trains entering New Street station, Birmingham, are to be brought under such complete control that they may be stopped at any part of the platform. It would seem that the rails outside the tunnel were more greasy than those inside it, and that the wheels of the tender, being skidded, commenced to slide more rapidly on emerging from the tunnel. Under these circumstances it is probable that if the tender break had been slightly eased, it would have had a greater effect on the train, and the driver ought certainly to have realized sooner than he did that he would not be able to stop short of the Walsall train, which he knew to be standing at the platform in front of him, and ought, therefore, sooner to have applied his patent break.

The evidence is not very clear as to the exact spot where this break was first applied, nor was any examination made after the accident to ascertain the state of the break, or position of break-blocks; but the point where the driver states that he pulled the break cord was at least 130 yards from the point of collision; and it is difficult to imagine that, if the break had been in proper order, it could have failed to stop the train in this distance, considering the slow speed at which it was running.

There can be no doubt that a train fitted throughout with proper continuous breaks would have been stopped in time to avoid the collision.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.
F. A. MARINDIN,
Major, R.E.

Printed copies of the above Report were sent to the Company on the 22nd February.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade, (Railway Department),
13, Downing Street, London, S.W.,

15th February 1879.

SIR,

IN compliance with the instructions contained in the Order of the 29th ultimo, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the collision that occurred on the 24th ultimo, at the Shropshire Union junction, on the London and North-Western Railway.

The mail train from Shrewsbury, which is due to arrive at Stafford at 11.4 p.m., ran into a light engine at the junction at 11.5 p.m.

Three passengers in the mail train and the engine-drivers of the passenger train and of the light engine were slightly hurt. The two engines and a parcels van were damaged.

The mail train consisted of an engine and tender, a parcel van, a break-van, No. 46, with a guard, a post office van, a passenger coach with a patent break connected with van No. 46, which could be worked by the engine-driver, a composite carriage, another break-van with a guard, and a parcel van. The vehicles were coupled together in the order in which they are given. The light engine was standing close to the junction points and about 30 yards from the signal-cabin.

The Shropshire Union junction is situated at the north end of Stafford station. It is protected with home and distant signals, which are good signals. They are worked from a raised cabin and are interlocked with the points. The signalman cannot always see an engine which may be standing between his cabin and the junction points, in consequence of a bridge over the railway at the north side of his cabin, and the view of an engine-driver who may be approaching this junction from Shrewsbury is also very limited, in consequence of the line from Shrewsbury being constructed with a sharp curve as it approaches the junction.

The evidence is as follows :—

Evidence.

William Hadley said : I am an engineman in the London and North-Western Company's service. I arrived at Stafford on Friday night, 24th January, with the train due at that station at 10.20 p.m. The train terminates at Stafford, and after the passengers had alighted, and the parcels had been removed from the guard's van, I was requested to draw down to the Salop bridge for the purpose of shunting the empty carriages from the down line to the up bay siding. After arriving at the Salop bridge, the shunter who accompanied me unhooked the carriages from the tender, and desired me to give them a good push in, which I did. The carriages ran into the siding, leaving my engine standing upon the main line, a little on the north side of the bridge. After standing for about three or four minutes the Shrewsbury mail train came up and ran into my engine. I saw the Shrewsbury mail coming, and put on steam, with a view of getting out of the way, and was on the move when the collision occurred. I had one white light exhibited on the buffer of my engine. The usual practice in shunting the train in question is for the engine to go into the siding with the carriages, and after the carriages have come to a stand, to hook off and come out of the siding again. I did not know the shunter, and did not know why the usual practice was deviated from on this occasion. I work according to the shunter's orders. I did not leave the engine. Before the collision occurred, and after pushing back the carriages, I sounded my whistle once to call the attention of the signalman, so that he should close the points and let me up the main-line and across to the engine-sheds, but cannot say if he heard me. I did not think at the time that the passenger train was due. I remained on the engine and was hurt in the side. I was just moving when the passenger train ran into my engine at a speed of about 15 miles an hour. I have been 34 years in the Company's service, and 24 years a driver,

and have never met with a mishap before. It was the first time I had worked that train. My mate had got off the engine and was going to see why the pointsman did not let us back.

John Sherwin said : I was fireman to the engine of the train due at Stafford at 10.20 p.m. on Friday, 24th ultimo. After the carriages had been placed in the siding on the up side, our engine stood a little north of the over-bridge at the Salop junction. After standing for three or four minutes I called out from the engine to the pointsman and asked him if he was right for us. I called twice, but got no reply, but I heard the window opened and closed again. I then alighted from the engine, and was proceeding towards the signal-box to ask the signalman why we were being detained, when I saw the mail coming from the Salop line, and immediately a collision occurred. I called to my driver, and he got his engine just on the move before the collision occurred. As a rule, our engine has gone in the siding with the carriages, but on this occasion we did not, the shunter unhooking the carriages from the tender. Before leaving the engine I heard my driver whistle once to call the signalman's attention. I do not know why the engine was not run into the siding with the train, as is usual.

William Taylor said : I am signalman in the Salop junction signal-box at Stafford, and have been in the Company's service about five years, and in my present position about eighteen months. On Friday night, 24th ultimo, I was on duty when the carriages of the train due at Stafford at 10.20 p.m. had to be shunted from the down side to the up bay siding. The train drew down as usual, and crossed over from the down to the up main line, and after drawing ahead to clear the siding points the train was set back into the siding, the carriages and engines too, as I supposed.

I saw a light upon the last vehicle going in the siding, from which I concluded that the whole of the train, carriages, and engine were clear in the siding. Before the carriages were placed in the siding, I got the signal "train entering section" for the mail, and having reversed my points after the train got into the siding, I took off my distant and home signals, not knowing that the engine had been detached from the carriages, and was at that moment standing a little north of the over-bridge and entirely out of my sight. I never heard any one call out, nor was there any whistle; but a few moments before the collision occurred I heard the light engine moving, and then for the first time became aware that the engine was in the position stated. I have not known a case for eight or nine months where the engine has not accompanied the carriages in the siding until the night in question.

John Parrock said: I was driver of the Shrewsbury mail on Friday night, 24th ultimo, due at Stafford at 11.4. On approaching Stafford I noticed that the distant-signal was on, and sounded my whistle when the signal was taken off, and observing the junction-signals off I proceeded at a speed of about 10 or 11 miles an hour, when my engine came in collision with the light engine, which was a little south of the over-bridge. I did not observe anything in the way, and had no opportunity of pulling up the train. I was a little hurt in the back. I was in possession of the break-cord, which gave me control over one carriage-break. This carriage was the third vehicle from my tender. I had no time to do anything. My mate was putting on the tender-break at the time. I have been a driver 16 years; 20 years in the Company's service. Nothing was thrown off the rails. My engine was damaged. I was a little hurt.

John Harrington said: I am porter at Stafford station. I was on duty on Friday night, 24th ultimo, and was instructed by shunter Burton to accompany the empty carriages down to the Salop junction for the purpose of shunting them into the up bay siding. After crossing over and getting clear of the siding points I unhooked the engine from the carriages and

told the driver to hit them up. I rode in the break-van, which was next to the tender, and I stopped the carriages by applying the break. After they had passed into the siding and clear of the adjoining siding, I left the carriages and returned to the porter's room. I was not aware that anything wrong had occurred until five or six minutes afterwards. It was not my special duty to attend to the shunting of the carriages of this train, but I did so on this occasion at the request of Burton, and I have on many occasions attended to similar duty for other trains. On some occasions the engine has been detached as in the case referred to, and on other occasions the engine has accompanied the carriages in the siding. There were two white lights upon the van, which was the last vehicle to go into the siding, showing white lights to the north, and red lights to the south. I have been 2½ years in Company's service. I have been 10 months at Stafford and the rest of the time at Huyton Quarry, Liverpool.

John Burton, shunter at Stafford station, says: I have been in the Company's service about five years, and in my present position about twelve months. I was on duty on Friday, 24th ultimo. It was my duty to accompany the empty carriages down to the Salop junction, and to dispose of them in the up bay siding, but having occasion to go to the w. c. I requested porter Harrington to take the duty for me, and he did so. The usual practice is in disposing of the carriages for the engine to remain attached and to accompany the carriages into the siding, and during the last eight months I have not known a single instance where the engine has been detached from the carriages before they have come to a state of rest in the siding. I came on duty at 6 p.m. I sent the porter up with the train at 10.50. My last work was at 10.20 p.m., putting the 9.55 into the up siding at south side of station.

Edward Brooke, district inspector.—I find by the station book that the 5.15 p.m. from Carlisle which is the train referred to by shunter Burton, arrived at Stafford at 10.10 p.m.

Conclusion.

It would appear that the engine-driver of the light engine had been standing with his engine about three or four minutes on the main up line from Shrewsbury to Stafford, when it was run into by the mail train, which is reported to have been running at a speed of 10 to 15 miles per hour. The engine-driver of the light engine got his engine into backward motion just before it was run into, and thus lessened the shock of the collision. This driver had brought a train of empty carriages from the down side of Stafford station, and had pushed them back into the bay or dock line at the up side of the station. He should have taken his engine into the bay, with the coaches, such being the instructions and the usual practice, but he has to act under the instructions of the yard shunter, who on the present occasion detached the coaches from the engine while the train was on the main up line, and then directed the engine-driver to hit the coaches back into the bay, which he accordingly did.

The signalman failed to observe that the engine had been detached. He thought it had gone as usual into the bay with the train, and he lowered the signals for the mail train to approach, while the light engine was standing close to his cabin, but hidden from his sight by the over-bridge.

Although the engine-driver of the light engine stated that he whistled, and that he and his fireman halloed to the signalman to let their engine get away, they do not appear to have done so effectually, and the collision occurred just as the fireman was making his way to the signal-cabin to speak to the signalman. This is the first accident this driver has had during his 24 years service.

The engine-driver of the passenger train might have seen the light engine in sufficient time to apply the breaks, but he was running up to the junction in perfect confidence with "all right" signals, and if he had seen the light engine he could not have known that it was on the line on which he was running until he was quite

close to it, owing to the curve in the railway and the darkness of the night. He stated that when he observed his danger he was so close to the light engine that he had no time to pull the cord attached to the break of the coach, which was the third vehicle of his train. His fireman was applying the tender-break at the time, so as to stop at the station.

The collision was caused by the signalman at the Shropshire Union junction omitting to notice that the light engine was standing on the main line close to his cabin when he lowered the signals for the passenger train.

The collision would probably not have occurred if the regular shunter at Stafford had not neglected his duty and sent a young porter to shunt the empty passenger train from the down side of the line into the bay at the up side, instead of doing the work himself.

The shunter excuses himself for deputing this duty to the porter by saying that he had to go to the w. c.; but as his last work was putting away a passenger train at 10.20 p.m., and that the collision did not occur till 11.5 p.m., there was more than ample time for him to attend to both requirements.

To avoid accidents of this kind it is desirable that when engines are standing on passenger lines out of sight, (where the signalman who is charged with their protection may forget them,) that the fireman or shunter, or other person engaged with the engine, should remain close to the signalman until he obtains the signalman's leave to return to the engine and direct the driver to move it out of the way.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. H. RICH,
Colonel, R.E.

Printed copies of the above Report were sent to the Company on the 8th March.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, 19th February 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 12th instant, the result of my inquiry into the causes of a collision which occurred on the 6th instant, at Ordsall Lane, near Manchester, on the London and North-Western Railway.

In this case, as the 6.20 p.m. up passenger train from Bolton to Manchester, consisting of tank-engine and six carriages, the front and rear ones being third-class with break-compartments, was approaching Ordsall Lane station, at about 6.55 p.m., it came into collision, at the fouling-point of the junction of the up platform and up main lines, with the tail of a train of empty waggons which had been standing on the up main line, in order to allow the Bolton train to run into the station on the up platform line, and which by a mistake had commenced to set back.

Six passengers are returned as having been injured.

The rear vehicle of the goods train, an empty cattle truck, was destroyed, an empty horse-box at about the centre of this train was thrown off the rails, and slightly damaged, and the engine of this train, which was running coal-bunker first, was also damaged, the buffers, part of the framing, and one lamp being broken.

Description.

Through Ordsall Lane station there are three lines of rails, an up main through line, and up and down platform lines. The down platform is 270 yards, and the up platform 210 yards in length. The junctions of the up main and up platform lines at the two ends of the station are about 48 yards outside, and the fouling points nearly opposite to the ends of the up platform.

No. 3 signal-box, which contains 47 levers correctly interlocked, and works the signals and points at the west or down end of the station, is about 40 yards west of the facing-points of the junction of the two up lines, and the up home-signal post is 65 yards further west. Between the home-signal and the signal-box is one connection with the up line from some cattle docks, and close to the facing-points is a second connection with these docks.

The up distant-signal is about 800 yards outside the home-signal. The line is

straight and nearly level. Station yard working is in force from Victoria station, Manchester, through Ordsall Lane station yard, which extends for a considerable distance westward from the station.

Evidence.

William J. Hunter, goods guard eight-and-a-half years, states: On the 6th instant I was guard in charge of the 12.20 p.m. goods train from Liverpool, and to return from Ordsall Lane at 7.15 p.m. I was shunting off some cattle waggons, and we drew out of the Old Dock, on the up side of the line, at the west end of Ordsall station, on to the middle line through the station, and as soon as the tail of the train was clear of the fouling-point I signalled to the driver to stop. We were to stop there until an up passenger train had passed. Foreman Worrall stood down against the bridge, showing a red light until the passenger train had passed. I stood in the 6-foot way about six or seven waggons' lengths east of the fouling-point. There were about 30 waggons altogether of all sorts. One up passenger train passed, and then I made three shunts. The foreman then told me to draw up on to the middle line clear for another passenger train, and I did so. There were six or eight waggons less at this time. There were 12 or 14 empty cattle waggons at the rear of the train. I got up on to the down platform out of the 6-foot, as there was a down train passing. Foreman Worrall stood near the bridge opposite the pointsman's box, and he was to signal to me when all was ready for us to set back. While I was standing on the down platform a light engine came up along the up-platform line. At the same time a down goods train was passing on the down-platform line. As soon as the goods train had passed I saw the foreman showing a white light, which I thought was for me; so I gave my driver a signal to set back, and he commenced to do so. I thought the passenger train had passed. I took the light engine for it. My train had set back about three waggons' lengths, when the passenger train came up and struck it just about the points. If the foreman had shown a red light against me, as in previous shunts, the accident would not have happened. I believe that he was showing a white light to call the passenger train on, but I saw it quite distinctly. I was about 40 or 50 yards from him. I knew that the passenger train was to stop at the station. When I saw the white light shown by Worrall the down goods train had gone right away. The foreman told me to stand on the middle line till the passenger train had passed, and said he would give me a signal as soon as he was ready for us to set back. The collision happened at about 6.50. It was dark, and I could not see Worrall. The rear waggon was broken to pieces, and one horse-box about the middle of the train was thrown off the rails. The buffers of the engine were broken; it was tender first.

Henry Worrall, foreman shunter, states: On the 6th instant I was on duty in the Old Dock at Ordsall Lane. I told Hunter to draw his train out on to the middle line, to stand clear for a passenger train to pass on the up platform line. I showed him a red light to stop him, as soon as he was clear of the fouling-point with the platform line. I did not give him any special instructions or come to any special understanding about when he was to set back, but it was well understood that he was not to come back until he received a signal from me or from the signal-box. Both the home-signals were at "danger." The signalman told me to fetch in a light engine which was standing at the home-signal. I hand-signalled it on with a green light, and then the signalman told me to fetch forward the passenger train, which was approaching slowly, and had almost come to a stand. I brought it in with a green light too. I was standing about 30 yards from the points.

The train came in very slowly, not more than a walking pace. I had my back to the station, and did not know that anything was wrong until I heard a crash behind me, and, on looking round, saw that the engine of the passenger train had struck the tail of the goods train, which had commenced to set back. It is part of my duty to assist the signalman to hand-signal trains in when the slot is on from No. 2 box and the home-signals cannot be lowered. I cannot tell what Hunter means by saying that while he was standing on the middle line for a previous passenger train to pass I had shown him a red light. No previous train had passed at all since the shunting commenced. He knew perfectly well that he had to stand till the Bolton train had passed. He cannot possibly have seen me waving white light, for I had my back to him, and it was a green light.

Alfred Ashton, signalman three years, states: On the 6th instant I came on duty in No. 3 box, Ordsall Lane, at 2 p.m., for eight hours. The shunting of the 7.15 p.m. down goods train was going on. The goods train was sent on to the middle line to stand for the Bolton passenger train to pass. Foreman Worrall was standing within about 10 yards of my box. I got the light engine from No. 5 box, and it came to a stand at the home-signal, which was at "danger." While it was standing there I got the Bolton passenger train. My distant-signal was at "danger." As soon as I got the passenger train I told the foreman porter to make the shunt he was engaged on the last, and then to draw clear on to the middle line. When it was clear on to the middle line I wanted to send on the light engine, but could not take off my home-signal, as the slot was on. I told the foreman to hand-signal it in, and he did so with a green light. While it was going up to the platform line the passenger train arrived at the home-signal. It did not quite stop. I told the foreman to bring it in with a hand-signal. He showed a green light. I am certain of this. His back was towards me, and he was facing the passenger train. I do not think it possible that Hunter can have seen him show a white light. There is no block working. It is station yard working, except for through expresses. The passenger train was due at 6.53; it arrived at 6.55. I did not know anything about its running till I heard from No. 5. No. 5 passes on the signal as soon as he receives it, so that I get plenty of warning.

James Ivers, passenger driver three years, states: On the 6th instant I was driver of the 6.20 p.m. up passenger train from Bolton, consisting of tank-engine and six coaches, the front and rear ones being third-class breaks. I left Cross Lane about right time. The signals were right till I arrived in sight of No. 3 box up distant-signal, which was at "danger." I whistled for the signal. I came slowly past it, and on pulling up towards the home-signal saw that it was also at "danger." Just as I was preparing to stop I was hand-signalled in with a green light. I put on steam to come in, and was running at about six or seven miles an hour when I saw the tail of the goods train in front of me. I was only about six yards off it, and I had no time to do anything. I remained on the engine and was not knocked down. I was running coal-bunker first. The coal-bunker and part of framing were slightly damaged, and one lamp broken. No vehicles in my train were off the rails. Several passengers were hurt.

Conclusion.

This collision was due to a mistake of the goods guard in charge of a train of empty cattle-trucks, which was being shunted in and out of the cattle docks west of Ordsall Lane station.

This man had been instructed to shunt his train on to the up main line, and to wait there until the up passenger train from Bolton had entered the station on the up platform line, when he would be called back by hand-signal from the foreman shunter who was standing behind the train near to No. 3 signal-box.

It appears that, owing to the slot from No. 2 signal-box at the east end of the station not having been taken off, the signalman in No. 3 box was unable to lower his home-signal, and that, therefore, he directed the foreman shunter to hand-signal into the station, on the up platform line, first a light engine, and then the Bolton passenger train, both of which had been stopped, or nearly so, at the up home-signal. While this was being done, in the case of the passenger train, the guard of the goods train states that he saw a white light, which he took for the signal for him to set back, and as he had mistaken the light engine for the passenger train for which he was told to wait, he called his driver back, and the tail of his train met the engine of the passenger train at the facing-points of the junction of the two up lines, fortunately while both trains were moving very slowly. The evidence shows clearly that the foreman shunter had his back turned to this guard, who was on the down platform about 50 yards from him, and also that he showed a green light, and not a white one, to the light engine and to the passenger train, and it is therefore probable that the guard is mistaken in thinking that he saw a white light, while, even if, on account of the lamp shade being turned incompletely round, he did happen to catch a glimpse of a white light, it was very careless of him to have paid so little attention as to take the light engine for the passenger train, for which he knew he had to wait.

It is much to be regretted that the accommodation at the cattle docks at Ordsall Lane is so limited as to necessitate so much shunting on and off the main lines at such a busy place, but the danger, which must accompany the consequent hand-signalling, would be lessened if the slot were taken off the home-signal at No. 3 signal-box, and a separate arm provided as an up distant-signal from No. 2 signal-box, as this would enable the signalman in the former box to admit trains into the station without having recourse to hand-signals at all for passenger trains.

I have, &c.,

The Secretary.

(Railway Department,) Board of Trade.

F. A. MARINDIN,

Major, R.E.

Printed copies of the above Report were sent to the Company on the 5th March.

LONDON, BRIGHTON, AND SOUTH COAST RAILWAY.

Railway Department, Board of Trade,

SIR,

13, Downing Street, Whitehall, London, S.W., 12th April 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the order of the 1st ultimo, the result of my inquiry into the circumstances connected with the serious collision which occurred on the 27th February, between a passenger train and a pilot-engine, both belonging to the South-Eastern Railway Company, at the Forest Hill station of the London, Brighton, and South Coast Railway.

Thirty-four passengers have complained of having been injured on this occasion, and five of the South-Eastern Railway Company's servants were hurt, some of them seriously.

The two engines and four of the seven vehicles which were in the passenger train were much damaged. The details of the damage and a list of the persons injured are given in the Appendix.

Description.

Forest Hill station is situated about three miles south of the London, Brighton, and South Coast Railway Company's station at New Cross, from whence there is a long rising incline of 1 in 100, which terminates just before Forest Hill station is

reached. The line between London Bridge and Red Hill belongs partly to the London, Brighton, and South Coast Railway Company, and partly to the South-Eastern Railway Company, and it is worked over by the trains belonging to both railway companies.

In consequence of the long incline of 1 in 100, rising from New Cross station, it is customary to assist goods trains up this incline, by means of a pilot-engine behind but not attached to the goods trains. On this occasion the South-Eastern Company's 11.20 p.m. down goods train from the Bricklayers' Arms station to Dover, was assisted up the incline by a pilot-engine. The pilot-engine usually stops when the goods train has reached Forest Hill station, and it then returns to the Bricklayers' Arms station, or is placed in the sidings at Forest Hill.

There are four lines of railway at Forest Hill station; the two centre lines are the main down and up lines, and the two outer lines are the local down and up lines.

The traffic is worked upon the absolute block system, there being block telegraph signal-boxes at New Cross and Brockley stations, No. 9 bridge, and Forest Hill; the signal-box at Forest Hill is an elevated box, and is situated on the western side of the railway, about 85 yards south of the south end of the down main line platform.

The trailing points on the down main line of the cross-over road from the down to the up main line, by which the pilot-engine, after it reached Forest Hill, would cross over and return to the Bricklayers' Arms station, are situated about 49 yards south of this signal-box, and the trailing points connecting the down main line with the sidings lying on the eastern side of the railway, are 204 yards south of the signal-box.

The signalmen who are employed in the several signal-boxes between New Cross and Forest Hill in working the block system are required to record any cases in which the pilot-engine which is employed behind the goods trains, in assisting them up the incline from New Cross to Forest Hill, fails to carry tail lights.

The collision is stated to have occurred nearly opposite to the up home or rear signals at Forest Hill station, or 154 yards south of the signal-box, and tail lights on an engine standing at this spot can be seen from an engine running on the down main line while it is passing the Forest Hill down platform, at a distance of about 280 yards.

The greater portion of the evidence had been taken down by the officers of the two companies concerned, within a day or two of the occurrence; it was read over to the men when they came before me, corrected where required, and the alterations and additional evidence subsequently taken are printed in italics.

Evidence.

Walter Thomas West, signalman on duty at Forest Hill last night, 27th February, states: I have been in railway service 27 years, 11 years on the Great Northern Railway, and 17 years on the Brighton line. I have been signalman the whole of my time on the Brighton Railway. *I have been a signalman in the Forest Hill signal-box over nine years.* I commenced duty at Forest Hill at 10.0 p.m.; at 11.46, I received a signal from No. 9 bridge for the 11.20 p.m. down South-Eastern goods train from Bricklayers' Arms. The train passed my box at 11.50 p.m., and as the engine and front part of the train passed I was looking out of the windows at the north end of the box, the sash being open; but before the whole of the train had passed I went to pull off my up main and local line signals, the up mail train being due, and a train from the Crystal Palace being nearly due. Having pulled off my signals, I looked out to see if the down goods train had passed complete. I saw the tail lamps of the train when the last vehicle had passed my box about 20 or 30 yards, and I then gave the "clear" signal back to No. 9 bridge box, at 11.51 p.m. I could not see any engine at the rear, and I am positive there were only the lights on the last brake visible. After the goods train had passed I stood at my signal lever and looked towards Sydenham for the purpose of seeing if the goods train had brought a pilot behind, but I could not see one; to make certain I went to the window and looked out, *at the south or Sydenham end*, the sash being open, but still I could not see any signs of a pilot-engine, and finally I concluded that the goods train had come down without an engine

behind. *That does not often happen.* The up mail train passed my box at 11.59 p.m. The next train signalled was the 11.40 p.m. down passenger train from London Bridge, given on from No. 9 bridge box at 12.0 midnight, given on by me to Sydenham at 12.2, cleared back to No. 9 bridge at 12.4, and cleared from Sydenham at 12.7 a.m. *That train was running on the down local line.* The next train signalled was the 11.53 p.m. from the Crystal Palace, given on from Sydenham at 12.4, given on by me to No. 9 bridge at 12.7 a.m.; this train passed my box just about the time the collision took place; and Mr. Smith, station master, immediately after came to my box, and told me to block both up and down lines, consequently I did not give "line clear" back to Sydenham until 1.36 a.m., but the train was cleared back as having passed No. 9 bridge at 12.12 a.m. The next train signalled out was the 11.53 p.m. South-Eastern train from London Bridge, given on from No. 9 bridge box at 12.5 a.m., given on by me to Sydenham at 12.7 a.m., when the engine of the train was at the south end of the down platform. After the train passed my box I saw the tail lights complete, and I then gave the clear signal back to No. 9 bridge, which is booked at 12.7. On the question being put to West by Mr. Sears, as to whether this train had one or two tail lamps on, West wished to qualify his previous statement as to the tail lamps being complete, as he could not be positive as to whether the train had two lamps alight or one, but West is positive he saw one. I was told by Mr. Smith the station master, after the collision, that this train

had one tail lamp only alight. Immediately after I had given "clear" to No. 9 bridge, and the down Dover train had passed my box, I heard a noise, which sounded to me something like a fog-signal going off, or not so loud, but I had no idea that it was a collision after I heard the noise. I also heard an engine whistle; *there were three whistles, similar to what is given for the breaks to be put on*; and I noticed the train still going forward, and I saw it come to a stand, as far as I can say, close to the foot bridge over the line. As I was looking out of the box to see what was the matter, Mr. Smith, the station master, came down the line from the station, and I said to him, "I think there is something the matter with that train, Sir," and he replied, "I think there is, I will go and see." I did not hear any whistling from the pilot engine after the goods train had passed, until the collision took place. It is usual for a pilot-engine to assist this goods train to Forest Hill, but exceptions have occurred when it has not come. *I don't recollect any instances since the beginning of this year when this goods train has not been accompanied by a pilot-engine.* After the train had come to a stand near the bridge before mentioned, I could see a red light, which I concluded to be the tail light of the passenger train. I will not be positive there were not two. I cannot say how long it was after the collision before an engine was sent down to bring the train back to the station. *About a minute, it might be a little more, after I heard the noise, the fireman of the pilot-engine came back opposite to the signal box, and called out "That I had done a very pretty thing in "having nearly killed his mate and damaged their "engine," and I asked him what he meant, he said "Our engine was standing there," and I asked "What engine?" He replied, either "The pilot" or the "Pilot of the goods," or words to that effect, and he added, "We had our red lights on." This was said all in one breath. I said, "You had not." He rejoined that "They had." I replied, "I will swear you had not." I think he answered "We had," and I then told him the matter would be inquired into elsewhere. I believe that Mr. Smith, the station master, was not there when this conversation commenced, but he was there before it terminated. I forgot to mention to Mr. Williams that about 5.10 a.m. the fireman of the South-Eastern down passenger train engine came into the signal-box, and he said that "He saw no red light, and my driver says the same." There was nothing further. When a pilot engine accompanies a down goods train, sometimes the pilot-engine whistles to indicate that it wants to cross to the up main line, sometimes it does not whistle. I show a green light towards the pilot-engine by night as a signal for it to cross after I have blocked the road back to Sydenham for the up main line. The pilot-engine more frequently whistles for permission to cross, than it omits to whistle. It was a very dark night, and rather misty, but I could see the back lights of the up rear signals, and also the back lights of the up distant-signals, and also the back lights of the Sydenham down distant-signals. I saw all these lights when I was looking for the pilot engine. I had not received any signal from No. 9 bridge for any other down train on the down main line, about the time when the collision occurred. The next down train signalled, at 12.36 a.m., was for the Portsmouth down goods train.*

Walter William Field, surveyor, states: I was at the Sydenham end of the shelter of the up platform at Forest Hill station on the night of the collision. I got to the station at six minutes to 12 o'clock, and I left the station for New Cross by the up train, about 12.6 a.m. I was very anxious about my train, as I had to catch a South-Eastern train at New Cross for Blackheath, and in consequence I was looking out in the direction of Sydenham for lights, together with Mr. Smith, the station-master, and I saw no lights. I did not see a goods train pass towards Sydenham during the time I was there, but

I saw an express train going towards London about 12 o'clock, and I asked what train it was, and was told that it was the Brighton express; soon after that another express passed, and I was told that it was the down Dorking express. I remarked to Mr. Smith that it was very late for an express train to leave London, and he told me that it only ran one day in the week, on Thursdays,—I think he said Thursdays. I watched this down express train past the platform, until I heard a report of a collision, and saw sparks fly from the funnel or some other part of the engine, and then I heard a prolonged whistle for the first time. I had not heard any short whistles before that. I did not notice any light, white or red or green, though looking for them, ahead of the engine of the down Dorking express train just before I heard the noise of the collision, but immediately afterwards I saw the light of the engine of the up train which I was waiting for. I think it was red. I did not notice any tail lights on the Dorking express train. I attend here to-day at the request of Mr. Smith, the station-master, to state what I had observed while standing on the up platform on the night of the collision. A train to Penge or the Crystal Palace left the station about 12 o'clock; that was a stopping train, and not running on the same line as the down Dorking express. I did not watch that train particularly. I did not see the tail lights on that train. I did not see any signal lights when looking down the line for my train. I called Mr. Smith's attention to the collision. He remarked that it was some train shunting. I was not aware that there had been any collision before I left the station in my train.

James Fuller, train signal clerk at Forest Hill, who was on duty on the night of the collision, states: I have been in the service about 9 or 10 months, and have been a train signal clerk the whole time. I went into the signal-box that night at 6 p.m. I have been working in that box about five months. The South-Eastern 11.20 p.m. goods train from Bricklayers' Arms was signalled out from No. 9 bridge at 11.46, given on to Sydenham at 11.50 p.m., cleared back to No. 9 bridge 11.51 p.m., cleared from Sydenham at 11.53 p.m. I saw the train pass, and I noticed the tail lights on the goods train, but I did not see the pilot-engine. I remarked to the signalman "that ever since I have "been at this box this is the first time they have "come down without a pilot behind." The signalman said "Yes, it is funny they have come down without a pilot," and he looked out of the window, and I looked as well, but could not see anything of the pilot-engine. After the goods train had passed, the signalman went to the window and looked out, and when he came back he gave the "clear" signal to No. 9 bridge for the goods train. I am not positive as to whether the conversation about there being no pilot on took place before he gave "clear" or after, but it was when the goods train was about six or eight trucks' lengths past the box, it may be more. I noticed the train was going forward, and I could see the tail lights. The next train signalled was the Brighton mail on main line up, given on from Sydenham at 11.57 p.m., cleared back at 11.59, given on to No. 9 bridge at 11.59, cleared back from No. 9 bridge at 12.0. The next train signalled out was the 11.40 p.m. from London Bridge local train, given on from No. 9 bridge at 12.0, given on to Sydenham at 12.2, cleared back to No. 9 bridge at 12.4, and cleared from Sydenham at 12.7. Also at the same time, the 11.53 p.m. train from the Crystal Palace was given on from Sydenham at 12.4, given on to No. 9 bridge at 12.7, but not cleared back to Sydenham until 1.36 a.m., as the signalman did not give the "clear" signal back. The 11.53 p.m. South-Eastern train from London Bridge was given on from No. 9 bridge at 12.5, given on to Sydenham at 12.7, cleared back to No. 9 bridge at 12.7. I first put down this train as given on to Sydenham at 12.6, but when I looked up at the clock I saw 12.7 was the nearest time. The "clear" was not given from Sydenham till 3.0 a.m.

in consequence of the block. When the South-Eastern 11.53 p.m. down passenger train was signalled on to Sydenham it was passing the box, and the "clear" signal was given back to No. 9 bridge when the signalman could see the tail lights. I did not notice the tail lights on the passenger train. I heard the collision, and it sounded to me like a cannon going off, but I did not hear the engine whistle. The whole of the signals in the book are in my handwriting. I did not work the instruments either way. I watched the signalman working the instruments, and the entries are made according to his working. The signalman generally calls out to me main down "clear," or main up "clear," as the case may be. After the collision the fireman came to the box and said "You have half killed my mate and knocked the engine about; we had two red lights on." The signalman replied "You did not have any red lights on;" this was repeated two or three times. The signalman was looking about a good while to make sure there was no pilot-engine before the "clear" was given and after. The signalman did not appear to be satisfied, and kept going to the window and looked down to see if he could see the pilot-engine. I noticed when the passenger train had come to a stand after the collision that there was only one tail light on the passenger train. *I did not hear any whistle from either of the engines, either immediately before the collision or after it. It was a rather dark night and misty. I looked out of the window for the pilot engine, but I did not notice the back lights of any of the signals. I don't know whether the up local train (the up Crystal Palace train) left the station before the collision occurred or afterwards.*

W. Smith, nine years station master at Forest Hill, and 24 years in the Company's service, states: I did not see the South-Eastern goods train pass down. I was in my house at the time. I came on to the platform some two or three minutes before 12 o'clock to attend to the last up train from the Crystal Palace, due at Forest Hill at 11.59 p.m., as the train was a little late. I was standing on the platform watching for its coming, and looking down towards Sydenham. I saw no lights on the road; if there had been any I could have seen them from any part of the platform. After I had been standing there some little time the 11.53 p.m. down South-Eastern train passed, and I noticed the off side tail light was out, and directly after that I heard a bang, and I thought the engine had burst a tube. I got my hand lamp and made my way to the box, and West, the signalman, was looking out of the box, and he said, "I think there is something the matter with that train." I said "Yes, I believe there is; I will go and see;" and with that the fireman of the pilot engine came across and called up to West, and said, "You have done something for us to-night." West said "What do you mean?" The fireman then said, "That train ran into our engine. We had our lights all right." I said, "You had no tail lamps on your engine." I asked him where his engine was, and he said, "I do not know, and I do not know where my mate is." I then told West to block all roads, and I went down to the train and met a lot of passengers running over the line; so I got them into the siding, and told West to keep the 12.0 midnight Crystal Palace train until I ordered it on, and as soon as I got the passengers clear I got this train through; but previous to that I had sent for the platelayers and medical men, not knowing what injury or damage was done. I then telegraphed New Cross to make up a special train and send it on at once, and then I got the 12.20 down as far as the scene of the accident, and got the passengers into that train and sent them on to Sydenham, to prevent their walking back up the line. When the special train arrived, it picked up the passengers at Sydenham. I was engaged in conversation with a gentleman, Mr. Field, nearly the whole time from my coming on to the platform until I heard the noise of the collision. I am positive

when the South-Eastern train passed this station it only had one tail lamp alight. I did not afterwards notice how many it had on, but it was furnished with two when put back into the siding, and they were burning all right. *Mr. Field left by the train due at Forest Hill at 11.59. The collision took place about six or seven minutes past 12 o'clock, and it occurred before that train had passed the Forest Hill signal-box. I went on from the signal box to where the passenger train had stopped after the collision had taken place directly afterwards—one minute afterwards. I had no conversation with the driver of the pilot-engine, nor with the driver of the passenger train. I heard a tremulous whistle after the collision had taken place, but none before. I heard the conversation between the signalman and the fireman of the pilot-engine. I believe I passed the up local train as I was going towards the signal-box.*

Mark Watson, driver of South-Eastern Company's pilot engine No. 63, has been 14 years in the Company's service, five years of that time a driver, states: I commenced duty at 5.0 p.m. on Thursday, February 27th, at London Bridge, taking the engine from George Weston. I was the London Bridge pilot till 8.0 p.m. I went from London Bridge behind the parliamentary to Cannon Street, and then took the train from there to Charing Cross. I then stood as Charing Cross pilot till 9.35 p.m.; then went light from Charing Cross to Bricklayers' Arms, arriving there at 10.25 p.m. The next thing I did was to coal and water the engine, and then I stood in the siding until we piloted out the 11.20 p.m. goods train. I came out of the siding three or four minutes before the starting time. I assisted in the rear of the 11.20 p.m. goods train from Bricklayers' Arms to Forest Hill last night (27th February). We left Bricklayers' Arms about 11.20 or 11.22, had a clear run off the Bricklayers' Arms branch, but was brought nearly to a dead stand at the signals, north end of New Cross station, and we were again checked when approaching Brockley by signals, after which we had a clear run to Forest Hill. I gradually eased off from the train at the north end of the platform at Forest Hill, and shut off before I got to the signal-box. I finally parted from the train about opposite the signal-box, at the south end of the station, *about 11.50 p.m.* About five minutes before I left Bricklayers' Arms I went round the engine to oil the bearings, and I saw it had two tail lamps on, showing red lights, and burning all right. I did not see these lamps after, and I have not seen them since. I think we stood on the main down line at Forest Hill about 10 minutes, and during that time I saw my mate go round the engine, as I suppose, for the purpose of examining the lights. We had a red light on the tender, which was in front going up the bank. My mate said, "I must change the red head light, because there is an up train coming." I said, "Yes, you must not leave the red one on at that end." During the time I was standing on the down main line with my engine I did not sound the whistle; it is not usual to do so. *I have been driving the pilot-engine, not every day, for a period of five years.* While standing on the main down line my engine was opposite to the up rear stop signals, south end of the station. I saw the head lights of the down Dorking passenger train, 11.45 p.m. from Charing Cross, as it approached round the curve, and I think the train was about the centre of the platform when I first saw the lights. I immediately pulled over the lever to reverse the engine, put on steam to move towards Sydenham, and sounded the whistle, and I had moved, I should think, about 20 yards when the collision took place. After the collision I shut off steam, but the force of the engine and train behind pushed us along about 50 or 60 yards before we came to a stand, and the coals on the tender were pitched forward, nearly filling up the foot-plate. I could not get out until assistance arrived, and it was 15 minutes before anyone came; the fireman of the next engine assisted me out. My mate had gone to

examine the smoke-box end of the engine, and just as I saw the train approaching, he called out, "For God's sake put on steam; there is a main line train coming." I did not see him again for 20 minutes. The weather was hazy at New Cross and Brockley, but clear at Forest Hill, and where we were standing I could see the signal-box clearly, and noticed the man working the levers. *The engine, after the collision had taken place, stopped between the down distant-signal for Sydenham and the up distant-signal for Forest Hill—nearer to the down distant-signal for Sydenham than to the other. I think the passenger train was travelling, as near as I can say, at 30 miles an hour. I heard a whistle, I suppose from the passenger train engine, a moment before the collision took place. I was standing on the foot-plate of the engine when the collision occurred. The coals were thrown up to my waist. I was hurt in the left hand, leg, and hip. The moment I saw the lights of the passenger train I whistled, when it was at the platform. The passenger train engine had whistled before that train came in sight—the usual whistle when running through a station. That is my gauge glass. It was in a socket on the foot-plate, and I missed it before I was released from the coal. I had not noticed that my mate had the gauge lamp with him when he went round the engine. I don't know whether the glass in it was broken before the collision occurred or not.*

Charles Tombs, fireman to M. Watson, driver of South-Eastern pilot-engine No. 63, has been in the Company's service about five years, two years of which as fireman, corroborates the driver's statement as far as running to Forest Hill, and states: On arriving there I said to my mate, "I must change our red head light, or it will show towards the up line," and I changed it to a white light. About two minutes before the collision took place I went to the funnel end of the engine, round the frame, to look to my two red lights, which were still burning all right. As I saw the passenger train approaching, I called out to my mate, "For God's sake put on steam, there is a train coming, we shall be smashed," and as I was stepping down from the engine on the off-side the collision took place, by the force of which I was shaken, and fell down. I got up and ran across the up line. I did not notice an up train coming, but the engine of an up local train caught me on the side, and knocked me up against the pale-fencing. I laid there for seven or eight minutes, and could not speak; but on recovering myself, I made for the signal-box as fast as I could, and called out to the signalman, when I was on the ground, "You have done a nice thing for us to-night." He said, "Done what?" I said, "You have let that train run into our engine." He replied, "You never had an engine." As I was walking back to my mate I found two engines and the train together. I called out to my mate, "Mark, are you dead or alive?" and went round the other side of the engine and saw my mate. I should think we were standing on the down main line about 10 or 11 minutes, but we had not stood there two minutes before I changed the head light on the tender; after I had changed the head light on the tender and before going to the funnel end of the engine, I went on the foot-plate and shut off the feeds. The two lamps that were on the engine at the rear, going up the bank, were square pattern, round bull's-eye, called a "trumpet-faced" lamp. I did not see these lamps after the collision, nor have I seen them since; me and my mate looked for them at Forest Hill. The lamp that I changed to a white light on the tender remained after the collision took place, and was again changed to a red light. *When I went to the funnel end of the engine I had not the gauge lamp with me. It was broken before the collision occurred; the red glass was cracked. Sometimes my mate has whistled when standing at Forest Hill, and sometimes he has not. I think we stopped five or six minutes after the up main line train passed. We are due off duty when*

performing the same work a little after 1 o'clock. This was the last work that we had to do that night. I was hurt in the left arm and on the right hip. I was off duty for two days. The tail lamps were on the lamp irons at the funnel end of the engine, and both were burning, showing red lights. I was not on the ground when the collision took place.

James Ralph, ganger of platelayers, Forest Hill, produced two lamps found about 14 yards south of the up rear signal at that station; one was picked up on the down side of the line near the wall, and the other was picked up on the up side of the line near the fence; the gauge lamp was also found laying in the six-foot between the up Croydon and the up main line, near the spot where he found the engine lamps. *I could not say when these were found, but it might be after 2 o'clock a.m.* After the collision had taken place, I noticed the train engine had two head lamps and one tail lamp on. *The driver of the pilot-engine asked me for the lamps, but I did not tell him I had got them.*

George Brown, driver of 11.45 p.m. train from Charing Cross to Dorking, engine No. 113, has been in the service of the South-Eastern Company about 14 years, been a driver about three years, previous to which a fireman, states: On the 27th February I left London Bridge at the right time, and the signals were all right for my train as far as Forest Hill inclusive. I travelled up New Cross bank at a speed of about 25 miles per hour, and I was going a little faster when passing Forest Hill station platform. After passing Forest Hill signal-box, the first thing that attracted my attention was the sound of a whistle from an engine in front, which I found afterwards came from the pilot-engine; the collision took place almost immediately. I was looking on the local road, thinking it was an engine whistling there, until I caught sight of the funnel of the pilot engine. I did not notice any light on it. When I first heard the whistle I was behind the weather-board, and after I heard it I looked outside of the weather-board on the left-hand side of the engine. I pulled over the reversing-lever, but it flew back out of my hand again, and I think the collision took place when I was in the act of doing this. I had not time to shut off steam before the collision occurred, when I was knocked down by the force of it. Just as I had mounted the bank and was passing through the station I pulled the lever back a notch, which eased the blast, and the engine worked shorter. On recovering myself, as the engine was coming to a standstill, I got up and shut off the steam, which would only be partially on when passing Forest Hill station, the train being a light one, only about six carriages and a van. From the suddenness of the collision I could not see whether the lights were on the pilot-engine or not. When the train came to a stand, I sat down on the box on my foot-plate to recover from the shock, after which I got down to look after my fireman, and found him releasing the driver of the pilot-engine from the coal which had surrounded him on his foot-plate. The driver of the pilot-engine said, I expect my mate is underneath, and he said something, that he was in front of the engine, and as I understood him, doing something to the lamps. I was asked by some one from the engine of a train on the local line if I was hurt; the train on the local line was at a standstill. I believe the man asked me my name. I do not remember being asked about the signals. Some gentleman came to me, with a considerable amount of whiskers, and an overcoat on, and said, our signals were all right, were they not driver? And I said, Yes. He then went away again. *I was looking out for the signals ahead when passing through Forest Hill Station, and I think if there had been tail lights on the pilot-engine, standing opposite the up stop signals, that I must have seen them in running over the distance between the platform and the spot where the collision occurred. The whistling occurred from*

a quarter to half a minute before the collision occurred. I was travelling about 30 miles an hour at the time. My engine was not thrown off the rails, and I don't know of any vehicle in my train being off. I saw the Sydenham down distant-signal at all right as I was just passing the platform light. It was a dark night, but I could see the signals all right. I was hurt in the body and side, and had a cut over the eye. I have not yet been enabled to return to work.

Albert Barnard, fireman, about five years in the service of the South-Eastern Company, and nearly two years as regular fireman, states: I came on duty at 2.30 p.m. I was working as fireman on engine No. 113, driver Brown, 27th February, with the 11.45 p.m. train from Charing Cross to Dorking, which runs only on Thursday. We left London Bridge about a minute or two late; we had, I believe, six coaches and a break on the train; we were not stopped or checked by signal at any station between London Bridge and Forest Hill inclusive. I should think we came up New Cross bank about 30 miles per hour, it might be a mile or two more. When I got to Forest Hill I had just done my firing, and was looking out for the Sydenham distant-signal, but did not see it at all; and bringing my eyes down, I could see there was something in front of me just as we struck the engine. I just saw the funnel and dome of the engine by my white head light. I did not see any light on the pilot engine. I was riding on the right side of the engine. I was close on the engine before I saw it, it might have been two or three yards away. I think we were still running about 30 miles an hour. The collision took place immediately. I had no time to put on my brake. I heard a whistle just before I saw the pilot-engine, and which came from the direction of the pilot. I was knocked down on the foot-plate by the force of the collision. I was shaken and bruised on one side, and also bruised on my nose. I got up as soon as possible and put my break on, and I should think it was 300 or 400 yards before the engine came to a stand. As soon as we came to a stand, I asked my mate if he was hurt, and he complained of his arm being hurt a good bit. I looked after a little lamp we have on the foot-plate, which I use for oiling, and looked at my mate to see if he was cut about the face, and I saw he had a cut on the eye. My mate found the little lamp on the engine. I then went to look for the other driver, and he was standing on the foot-plate of his engine surrounded by coals. I assisted him out, and having got him out, I inquired where his mate was, and he said, he was round in front of the smoke-box, as I understood him, before the collision took place; he did not tell me what the fireman was doing round the smoke-box end of his engine; he told me he expected his fireman must have been killed, being at that end of the engine. The smoke-box of that engine was next to my engine. His mate came to us after I had got the driver out of the coal, a few minutes after this conversation. I cannot say whether there were lights on the engine or not, but I should think from my position I could not have seen them if they had been there. I was looking for the distant-signal at Sydenham, but did not see it at all before or after the collision. My eye was just brought down low enough to observe the funnel of the pilot engine, and I do not think I should have seen that if it had not been for the white head light on my engine. I was keeping a look out from Forest Hill station, from the south end of the platform, for the Sydenham distant-signal, but did not see it at all.

Henry Bowles, guard, 21 years in the service of the South-Eastern Railway, states: I was guard of the 11.45 p.m. down passenger train from Charing Cross to Dorking on the 27th February. My train consisted of engine and tender, six carriages, and a break-van at the tail of the train, in which I rode. We left at the proper time, and travelled all right as far as Forest Hill, and the first indication that I got

that anything was wrong, was in hearing an engine whistle, a vibrating whistle at first, and then as if the whistle had been left open. I immediately began to apply my break. I cannot say whether the whistle was from the engine of my own train or not. We might be running at the time at from 25 to 30 miles an hour. I was looking out along the top of the train before the whistle commenced. I believe we were going along the platform when it commenced. When I was looking out ahead, there was nothing that attracted my attention. I think the length of my train and the steam from the engine of my train would have prevented me from seeing the tail lights, if there had been any, on the pilot-engine standing opposite the up home-signals. I was standing on the right side of the break-van. I saw nothing whatever before the collision occurred. I could not say whether I saw the Sydenham down distant-signal before or after the collision had taken place. I saw it and it was off. There was not any whistle that I know of from the engine of my train for the breaks before the collision took place, and only a very trifling diminution of speed had taken place. I don't know at what time it occurred. There was no part of my train off the rails when we stopped. I was hurt at the back of my ear and in my leg, and have not yet been enabled to return to my work.

Joseph Adams, signalman 10 years and 5 months, and nearly 13 years in the service of the London, Brighton, and South Coast Railway Company, states: That I was on duty in the signal-box at Brockley on the night of the 27th February, and came on duty at 9.45 p.m. I had the South-Eastern Company's goods train given on to me from New Cross at 11.37, and gave it on to No. 9 bridge at 11.41, cleared it back to New Cross at 11.42, and got clear for it from No. 9 bridge box at 11.46. I noticed that train pass; it had two tail lights on the back of the pilot-engine, and two lights on the break-van; all were red lights, they were not showing very brightly, it was rather foggy. I am quite sure their lights were all burning.

Francis Townsend, engine-driver 8½ years, and 22½ years in the service of the London, Brighton, and South Coast Railway Company, states: That on the 27th February I had been working the 11.40 p.m. down passenger train from London Bridge to Epsom, and returned as a light engine from Epsom to New Cross. I was stopped at Brockley by signal, and I got off the engine and went to the signal-box, and asked the signalman what they had been up to at Forest Hill. He said they had been up to something there, and I said yes, the South-Eastern passenger train had run into a South-Eastern pilot-engine there. He asked if anyone was hurt, and I replied that I believed there were two or three passengers hurt. I said I heard at Sydenham that the pilot-engine had no tail lights on, and I asked him if he had noticed them as the pilot engine went by. He did not answer directly, but then said he was not certain, and nothing further passed. I was off the engine at the time on the down side of the line, and my engine was at the stop signal, about 50 yards from the signal-box. I left the engine in charge of my fireman.

Charles Nisbitt, train signal clerk at Brockley, 15 years of age, six months clerk and two years in the Company's service, states: I was on duty on the night of the 27th February, and came on duty at half-past 5 o'clock. I saw the 11.20 p.m. South-Eastern down goods train pass. I was looking out of the window at the time; there was a pilot-engine with it at the tail of the train. It had some tail lights burning, two were on the engine, and I saw one on the van at the rear of the train. I heard a conversation between driver Townsend and signalman Adams. Driver Townsend asked Adams whether the pilot-engine had any tail lights burning, and Adams answered "I don't know," "I am not sure." Adams told me afterwards that the pilot-engine had tail lights on. What I have

stated before was from my own observation, and not from what Adams told me. Townsend asked whether there were any tail lights on, as he had heard that the man at Forest Hill had said there were none. Adams asked me if I had seen the tail lights, and I said that I had seen them.

David Dixon, engine-driver 33 years, and 36 years with London, Brighton, and South Coast Railway Company, states: I was in charge of the 12.20 midnight train from London Bridge to West Croydon on the 27th February. On arriving at Forest Hill I was informed there had been a collision between the South-Eastern Company's passenger train and a pilot-engine. After stopping at Forest Hill I was ordered on to the place where the South-Eastern Company's train was standing, to take up the passengers, and when I was at the spot I spoke to the driver of the South-Eastern Company's train. I asked him if the signals were all right for him, and he said the signals were right, he was positive. I asked him if he could see the engine, he said no, the first thing that attracted his attention was the pilot engine whistling. I said what is your name, and he said "Brown;" my object in asking his name was to ascertain if I knew him, as I could not recognise him then, it being dark.

Charles Allison, fireman to driver Dixon working the London, Brighton, and South Coast Company's 12.20 midnight train, London Bridge to West Croydon, on the 27th February, states: On arriving at Forest Hill we heard there had been a collision, and our train was afterwards ordered on to the scene of the collision to take up the passengers from the South-Eastern train. While standing there opposite the two engines on the main line, I saw the driver of the South-Eastern passenger train and the guard. I asked the driver if he was injured at all or any of their chaps, and he said that he was injured and also his mate. My mate asked the driver how it occurred (meaning the accident), and he said that he did not know how it was. My mate asked him if he had the signals all right, and he said he had, and then he asked him if he saw the pilot-engine, and he said no, his attention was called to him by his whistling; the pilot engine tried to get out of his way, but it could not do so for slipping. When my mate asked him if he saw the pilot-engine lights, he said I saw no lights; these are the exact words he said.

George McClary, 14 years in the service of the London, Brighton, and South Coast Railway, and six months an engine-driver, driver of engine No. 211, states: I was shunting in the goods yard on the down side of the line at New Cross on Thursday night, 27th February, when the 11.20 p.m. South-Eastern goods train from Bricklayers' Arms to Dover passed down. My engine was in motion at the time, and shunter Allen was riding on the step; he said "That is the way to save oil." I said Yes, they have got no lights on (meaning the South-Eastern pilot engine had no lights on). I could see the two lights on the last break of the train. I am not quite positive whether Allen was on the step of the engine or was walking close by the side, he was either on the step or his mate was there. We were pulling out very steadily. I am positive there were no lights on the South-Eastern pilot-engine when he went past New Cross. I did not observe any lamp on the engine; I could not see whether there was one or not.

Harry Verrall, 14 months a fireman to driver McClary, engine No. 211, states: I was on the engine at the time the 11.20 p.m. down goods train, Bricklayers' Arms to Dover, passed by New Cross. Shunter Allen was riding on the step of our engine, it being in motion at the time. He (Allen) remarked "That is the way to save oil," and I looked and saw the South-Eastern pilot-engine behind. The goods train had no tail lights on. I noticed one light on the rear of the break at the near side, but I did not notice one

on the off side. I am sure Allen was on the step of the engine when he made that remark, and my mate replied to Allen, that there were no lights on the engine. I did not see Shunter Phillips at the time, but he was working with us in the shunting operations. I did not see any lamps on the pilot-engine.

William Allen, goods guard, in the service of the London, Brighton, and South Coast Railway at New Cross, states: I was on duty on the down side of the line between the Wharf Road, New Cross Road, and the down local, just by the down stop signals, when the South-Eastern Company's 11.20 p.m. down goods train from Bricklayers' Arms passed on the 27th instant. I noticed the rear break-van had two red lights, but there were not any lights on the pilot-engine behind the train. I said to the driver of engine No. 211, "That down pilot has not any lights behind;" the driver replied, "That's how they save oil on the South-Eastern." I am quite positive there were not any tail lights on the rear of the pilot-engine. I could not see whether the lamps were there; it was too dark. I could not see whether the pilot engine had any head light, or not, on in front. There was only one line of rails between the Wharf Road, where I was standing, and the main down line on which the goods train was running. The pilot-engine was close up with the break-van of the goods train.

George Phillips, goods guard in the service of the London, Brighton, and South Coast Railway Company at New Cross, states: I was on the down side shunting at New Cross on Thursday night, 27th February. I saw the South-Eastern Company's 11.20 p.m. goods train pass New Cross about 11.40 p.m. I noticed the pilot-engine at the rear of the train. I observed the lamps (two) alight on the break-van, but there were not any lights on the pilot-engine. I did not mention it to any one, or take any steps in the matter. This train did not go through the station very fast; it was not stopped. I did not see the next train pass down. I was afterwards sent in charge of a train from New Cross, empty, to Forest Hill, to take on passengers to Red Hill. On arriving at Forest Hill, I asked Mr. Smith, the station master, the cause of the collision. He said, the pilot was standing on the main line down without lights on. I answered, I saw it come through New Cross without tail lights. I did not notice any head light on the pilot-engine. I am quite certain the pilot-engine had not lights on when it passed New Cross. I did not see any lamps; I could not as it was so dark. I was on the step on the engine No. 211, driver McClary, who said, when the South-Eastern train passed down, that is the way they save oil on the South-Eastern. Allen was at the time 8 or 10 yards from the engine. I don't know that it was my duty to report the absence of tail lights on the pilot-engine.

George Beard, 11 years a signalman, on duty at No. 9 bridge signal-box last night (27th February) states: When the South-Eastern 11.20 p.m. goods train from Bricklayers' Arms passed my box, I saw the tail lights on the last break-van. I noticed there was a pilot-engine behind the train, but I could not see that there were any tail lights on it, because they are lower down than the break lights. I am positive there were tail lights on the break, but I am not positive there were no tail lights on the pilot-engine. If I did not see the tail lights before they passed under the bridge, I cannot see them again for nearly a quarter of a mile, and it was rather hazy last night. After the train passed under the bridge, I was engaged pulling my signals off for the up local line, and I did not look further to see if the pilot had tail lights on. When the goods train passed my box, I could see tail lights on the break; but those on the pilot-engine being lower, I could not see where I stood. When the 11.53 p.m. South-Eastern train passed my box, I noticed that it had two tail lights

burning ; of this I am not in any doubt. *If I had failed to observe any tail lights on the pilot-engine, it would be my duty to enter a remark in the signal-box.*

Edmund Peel, guard, but was acting as platform inspector at Forest Hill on the night of the 27th February, *six years in the Company's service*, states: I did not see the South-Eastern goods train pass down, being at the time in the collector's room. I came on the down platform as the 11.40 p.m. train from London Bridge was coming into the station. I attended that train, and came across to the up platform to give Mr. Smith, the station-master, a letter. He was at the south end of the shed over the platform, in conversation with a passenger. Mr. Smith instructed me what time I was to come on duty the

following day ; and as I was waiting there for the up train, I saw the South-Eastern passenger train run through. When on the up platform, I looked towards Sydenham to watch the arrival of the train, 11.22 p.m. from Victoria, due at Forest Hill at 11.59. I did not see any red lights. The night was clear. I noticed the South-Eastern passenger train pass, and it had two tail lights on, one on each side of the upper part of the break ; both were burning. After the train had passed, I heard a slight noise, which sounded like a gauge glass or tube having bursted. I left duty, and came home by the up Crystal Palace train, and was not aware there had been a collision until the following day. *If there had been any red tail lights on the pilot-engine I should have seen them. I could see the red light of the 11.22 up train.*

Conclusion.

From the preceding statements, it appears that the South-Eastern Company's 11.20 p.m. down goods train from Bricklayers' Arms station to Dover, was assisted on the night of the 27th February up the bank from New Cross to Forest Hill station, by a South-Eastern Company's pilot-engine, No. 63, running on the down main line with the tender in front, at the rear of the goods train ; and while the goods train continued to run forward, the pilot-engine slackened speed, and finally stopped just opposite to the Forest Hill station up home or rear signals, 154 yards south of the Forest Hill signal-box, and 105 yards south of the trailing points of the cross-over road by which it would have to cross to the up main line, in order to return to the Bricklayers' Arms station, where on arriving it would have finished its night's work.

It appears that the pilot-engine was not seen by the signalman (West), nor by the train signal clerk (Fuller), in the Forest Hill signal-box, although it is distinctly stated that both looked out for the pilot-engine ; both saw the tail lights on the break-van of the goods train, and remarks passed between them as to the unusual absence of the pilot-engine. This goods train passed the signal-box at 11.50 p.m., and "line clear" was given back for this goods train to the signalman at No. 9 bridge box at 11.51 p.m., while the pilot-engine was standing on the down main line, opposite to the up home-signals.

The Brighton up mail train due to pass Forest Hill station at 11.55 p.m., was signalled forward from Sydenham at 11.57 p.m., and this train, travelling on the up main line, passed Forest Hill station at 11.59 p.m.

The next train signalled was the 11.40 p.m. down passenger train from London Bridge, which was running on the down local line, was cleared from Forest Hill signal-box back to No. 9 bridge signal-box as having passed at 12.4 a.m.

This down train was followed by an up train, 11.53 p.m. from the Crystal Palace, signalled on from Sydenham at 12.4 a.m., and forward to No. 9 bridge signal-box from Forest Hill at 12.7 a.m.

The next train signalled was the 11.53 p.m. South-Eastern Company's down passenger train from London Bridge (11.45 p.m. from Charing Cross) which only runs on Thursdays, which was signalled on from No. 9 bridge signal-box at 12.5 a.m., and was given on by the signalman, West, to Sydenham at 12.7 a.m., when the engine of this train was at the south end of the down platform ; the station signals being all off for this train to run through Forest Hill station without stopping. This train consisted of an engine and tender, six coaches, and one break-van, with a guard riding in it, and it appears to have been running at the rate of 30 miles an hour when the driver's attention was attracted to the sound of a whistle from an engine in front, which he afterwards found came from the pilot-engine, and the collision took place almost immediately. The driver states that he was looking on the local road, thinking it was an engine whistling there, until he caught sight of the funnel of the pilot-engine, and he did not notice any lights on the pilot-engine.

When he first heard the whistle he was behind the weather board, and after he heard it he looked outside of the weather board, on the left-hand side of the engine ; he pulled over the reversing lever, but it flew back out of his hand again, and he thinks the collision took place while he was in the act of doing this ; he had not time to shut off the steam before the collision occurred, when he was knocked down by the force of it, and was seriously hurt. Neither the driver of this train, nor his fireman, saw any tail lights on the pilot-engine, the driver stating very distinctly, in reply to my questions, that he was looking out for the signals ahead when passing through

Forest Hill station, and he thought if there had been tail lights on the pilot-engine standing opposite to the up stop signals he must have seen them in running over the distance (280 yards) between the platform and the spot where the collision occurred.

The line is on a curve to the left at this part, and the Sydenham down distant-signal, for which the driver was keeping a look-out, would be seen a little to the left of the spot where the pilot-engine stood. The driver saw the Sydenham down distant-signal; his fireman did not, but he was riding on the wrong side of the engine (the right side) for seeing that light.

The Forest Hill station-master and a passenger were standing on the up platform, the latter looking out and waiting for an up train; both declare that no red lights were to be seen where the pilot-engine was standing immediately before the collision took place.

Similar testimony was given as to the absence of tail lights on the pilot-engine by the driver and fireman of the Brighton Company's shunting engine, and two guards of a goods train who were engaged with them at New Cross station, who all noticed the pilot-engine at the rear of the South-Eastern Company's goods train as it passed that station, and who remarked on the manner in which "oil was saved" on the South-Eastern Railway.

The signalman on duty at Brockley station, however, stated that the pilot-engine had tail lights on, when the train passed; but his testimony was contradicted, or rather weakened, by another servant of the Brighton Company asserting that this signalman had made a different statement when first questioned on the subject; the train signal clerk at Brockley confirmed the evidence as to the Brockley signalman having varied in his statement, but he also said that there were tail lights on the pilot-engine as it passed Brockley. A large amount of testimony was forthcoming, although the men were not brought before me, as to the fact of the pilot-engine having had tail lights on and burning, when the goods train left the Bricklayers' Arms station, including that of the driver of the pilot-engine, and yet such evidence would not prove that these lights were burning at the time the collision took place at Forest Hill.

I should state that the effect of the collision was to drive the pilot-engine (which had previously been put into slow motion by the driver when he saw the 11.53 p.m. passenger train approaching) ahead, and it stopped with the passenger train rather more than 460 yards from the spot where the pilot-engine had been standing. When the engines and train were brought to a standstill no vehicle was found off the rails, but the wheel of some vehicle had apparently been off the rails inside the right rail, and had broken two chairs, had struck a check rail, and had apparently got on to the rail again at the trailing points of the through crossing road from the sidings lying on the eastern side of the line to the down main line. The driver of the pilot-engine was found on the foot-plate of the engine, embedded in coals. His fireman was not with the engine when it stopped, and his statement of what had occurred is as follows: "About two minutes before the collision took place, I went to the funnel end of the engine to look to my two red lights, which were still burning all right. As I saw the passenger train approaching, I called out to my mate 'For God's sake put on steam, there is a train coming; we shall be smashed;' and as I was stepping down from the engine on the off side, the collision took place, by the force of which I was shaken and fell down. I got up and ran across the up line; I did not notice an up train coming, but the engine of an up local train caught me on the side and knocked me up against the pale fencing. I laid there for seven or eight minutes, and could not speak, but on recovering myself I made for the signal-box as fast as I could, and called out to the signalman, when I was on the ground, 'You have done a nice thing for us to night,' he said, 'Done what?' I said, 'You have let that train run into our engine;' he replied, 'You never had an engine.'" He also informed me "that the tail lamps were on the lamp irons, at the funnel end of the engine, and that both were burning, showing red lights, and when I went to the funnel end of the engine I had not the gauge lamp with me. It was broken before the collision occurred, the red glass was broken."

This is, taken altogether, a somewhat remarkable statement. Two lamps, evidently those belonging to the pilot-engine, were found nearly opposite to the spot at which the collision occurred, one near the wall at the eastern side of the railway, and the other at the western side of the railway near the pale fence. The gauge lamp was found near the same spot, in the six feet space, between the two up lines. The two tail lamps are stated to have been on the lamp irons at the funnel end of the pilot engine, and they are said to have been found on the ground after 2 a.m. The red glasses were cracked, and they were otherwise slightly damaged. I cannot

understand how the effect of the collision should have drawn these two lamps from the lamp irons, and thrown one a considerable distance to the right and the other just as far to the left, and the gauge lamp from a socket on the foot-plate.

The pale fence against which this man states that he was knocked, and where he laid seven or eight minutes, is about five or six yards from the up local line, and the wires from the signal-box to the signals stood quite close to the up local line and are fixed high enough to have thrown him down. I do not comprehend how a man could have been knocked by a passenger train five or six yards across a cluster of wires against a pale fencing without being very seriously hurt.

The signalman (West) says that the fireman "came back opposite to his box, about a minute, it might be a little more, after he heard the noise" (of the collision), and the conversation took place to which I have already referred.

The Brighton up mail train passed at 11.59, and the driver of the pilot-engine admits that he took no steps, by whistling or otherwise, to attract the attention of the signalman to the fact of the pilot-engine being there and waiting for permission to return to the Bricklayers' Arms, or to be shunted into the sidings. He and his fireman differ as to the practice which prevails as regards whistling, but the signalman states that they more frequently whistle than omit to do so. The collision occurred about 12.7 or 12.8 a.m., and there was therefore abundant time for the pilot-engine to have crossed to the up main line after the up main line train had passed, and to have gone on its way to the Bricklayers' Arms station before the collision took place, if the driver had only made known to the signalman that he was standing there, and waiting to return or to be put into the sidings.

As the result of a careful consideration of the whole of the evidence placed before me, and from an examination of the Forest Hill station, I have arrived at the conclusion that the driver of the 11.53 p.m. down passenger train could not have failed to see tail lights on the pilot-engine, if he had been, as he states that he was, keeping a look-out for the down signals, if these tail lights had been burning; and I infer from this man's statement, combined with the evidence given by the signalman, signal clerk, station-master, and the passenger, Mr. Field, that the pilot-engine had not, when it stopped at Forest Hill station, any tail lights burning. I think it probable that the fireman went to the funnel end of the engine, taking the gauge lamp with him, for the purpose of trimming and lighting those tail lamps, and that he had removed them from the lamp irons for the purpose of doing this shortly before the collision happened. On these grounds I do not consider that the signalman, West, was to blame for having given back "line clear" to No. 9 bridge box after the goods train had passed, at 11.51 p.m.

No collision need have resulted from the absence of these tail lights, if the driver of the pilot-engine had whistled for the points of the cross-over road to be opened by the signalman, as soon as the Brighton up mail train had passed the signal-box, and hence, in my opinion, this collision was entirely due to the acts of omission of the servants of the South-Eastern Railway Company in charge of the pilot-engine.

To avoid a repetition of the same kind of collision in future, it appears to me desirable that the pilot-engine should be stopped, and stand just south of the points of the cross-over road, 49 yards south of the Forest Hill signal-box, and the driver should, in all cases, make known the fact of his standing there, to the signalman in the signal-box, by sounding the engine whistle.

This collision was reported to the Board of Trade, by the South-Eastern Railway Company, on the day after it occurred, as being a slight one, and caused through a mistake of a signalman; that only two or three passengers complained, and that beyond the shock, there appeared to be no serious injury; whereas it occurred between a passenger train travelling at 30 miles an hour and a pilot-engine only just in motion, and it is impossible to read the statement of the damage done to the two engines and to four out of seven vehicles of which the passenger train was composed, together with the list of persons injured, 36 in number, given in the Appendix, without arriving at the conclusion that it must have been a fearful collision, and the most remarkable fact connected with it is, that it was not attended with any fatal results.

I had occasion to request that I might be supplied with a list of the persons injured, and a statement of the damage done to the rolling stock in this collision, which I had previously asked for at the time when my inquiry was held; and when this list and statement were first sent to me, the list of the persons injured did not include any of the Company's servants, and the statement of the damage to the rolling stock omitted all reference to the two engines which came into collision with each other, and mainly bore the shock. I returned both documents to be made complete, and on

again receiving them I find that only two out of the five servants of the Company who informed me that they were hurt on this occasion, viz., the driver and fireman of the passenger train engine, are mentioned, and the names of the driver and fireman of the pilot-engine, and the guard of the passenger train, are omitted from this list. The driver and guard of the passenger train told me, 22 days after the collision had taken place, that they had not then been enabled to return to their work on account of the injury they had received.

The Board of Trade do not inquire into all accidents and collisions which are reported to them to have occurred by the railway companies concerned. It is therefore of importance that correct information on these occasions should, as far as possible, be forwarded to the Board of Trade, to enable a correct opinion to be formed as to the necessity that exists, or otherwise, as regards inquiring into the circumstances which have led to such particular accident or collision.

The Secretary,
(Railway Department),
Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

APPENDIX.

South-Eastern Railway, Manager and Secretary's Office, London Bridge Station, S.E., April 5th, 1879.		No.	Class.	Description of Damage.
SIR, I AM in receipt of your letter, dated yester lay, and have added the names of the engine-driver and fireman to the list of persons injured. I also send you a statement showing the damage to the engines and tenders, as desired. I am, &c., Colonel Yolland, 13, Downing St., S.W.		1613	First	Off the line. Two headstocks, two soles, end bars, buffer packings, buffer casting, step boards broken, buffer rods and axle guards bent, bottom sides, end bars, end framing, and panelling broken, and iron work much damaged.
JOHN SHAW, Manager and Secy.		853	First	Body pillars, end framing, panels, one step board, four buffer blocks, and three quarter glasses broken, axle guards, buffer rods, and step irons bent, and iron work injured, and body shifted on underframe.
PARTICULARS OF DAMAGE TO ENGINES.		1585	Second	Body very much damaged, two headstocks, buffer packings, corner pillars, standing pillars, door pillars, and three quarter glasses broken, axle guards and buffer rods bent, and other iron-work damaged.
Pilot Engine, No. 63.		814	Third	Axle guards injured.
Outside and inside frames bent and broken. Buffer plank and buffers broken and draghook bent. Life guards broken. Front plate of smoke-box broken. Cylinders broken. Steam chest cover broken. Hide spindles bent and the glands broken. Motion bar hanger plate bent. Boiler shifted $\frac{1}{2}$ " forward. Tube plate bent smoke-box end. Wing plates bent. New angle irons required leading end of frames.		1148	"	Side springs damaged and two doorway plates broken.

Passenger Train Engine, No. 113.

Frames and angle iron bent.
Buffer plank and buffer broken.
Steam chest cover broken.
Hide spindles bent and the glands broken.
Boiler shifted a little, and the angle iron, smoke-box end, sprung.

The following CARRIAGES were DAMAGED in the COLLISION at FOREST HILL on the 27th February 1879.

No.	Class.	Description of Damage.
875	First	Panels broken, buffer blocks damaged, buffer rods and step irons bent, and bearing springs injured.

LIST OF INJURED PASSENGERS in the COLLISION at FOREST HILL, February 27th, 1879.

John Hulbert.	F. T. Edridge.
H. S. Hubbard.	A. G. Russell.
Henry Gower.	H. E. Omerod.
Mrs. Gower.	Mrs. J. Bayliss.
George Barber.	Mrs. Jno. Bayliss.
J. S. Gainsford.	William Ruxton.
John Glenn.	Miss Ancubach.
W. Edmunds.	W. C. Hingston.
F. C. Pawle.	W. Maidment.
W. Hanscomb.	H. R. Harris.
Mrs. Hanscomb.	Miss L. Pitcher.
E. Williams.	Miss R. Pitcher.
R. F. Crafton.	Miss E. Hingston.
Sergt. White.	W. G. Stevenson.
Mrs. White.	C. A. Smith.
George Frisch.	A. G. Randall.
Fredk. Ford.	H. Lawford.
Driver, Brown.	Fireman, Barnard.

Printed copies of the above Report were sent to the London, Brighton, and South Coast and the South-Eastern Railway Companies.

LONDON, CHATHAM, AND DOVER RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, Whitehall, London, S.W., 7th February 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 27th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 25th ultimo to a passenger train at the Ludgate Hill station of the London, Chatham, and Dover Railway.

One passenger complained, at the time, of having been shaken, but it is thought that, as the train was only travelling slowly when the accident occurred, he was not seriously hurt.

A third-class break-carriage next to the engine had an end panel damaged, and a head-stock broken, and the buffers bent. A second-class carriage had a side spring and a step-board broken; while but very little damage was done to the engine of the train, which got off the rails at a pair of facing-points, ran across the north end of the main-line platform, knocked down an inspector's box, and narrowly escaped running against the uprights supporting the high signal-box, and it damaged the side walls of the staircase leading to the platform from below, and did considerable damage to the permanent-way.

Description.

There are four lines of railway at the Ludgate Hill station, numbered from 1 to 4. Nos. 1 and 2 run on the western and eastern sides of what is called the Metropolitan platform, or the Western Island platform of two which are at the station, and Nos. 3 and 4 lines run on the western and eastern sides of the main line platform, which is to the east of the Metropolitan platform.

About 45 yards north of the signal-box at the north end of the station, at the south end of the under-bridge which crosses Ludgate Hill, there is a pair of facing-points on No. 4 or the eastmost line of rails, for a through crossing line to No. 2 line of rails on the eastern side of the Metropolitan platform, and 30 yards further south there is a second pair of facing-points on this through crossing line, for connecting it with No. 3 line of rails. The accident commenced at the facing-points on No. 4 line of rails. These facing-points are worked from the signal-box, and they are provided with a locking-bar placed in front of them, to prevent the signalman from moving them while a train is in the act of passing over them. But there is no facing-point lock, by which the tongues of the points are securely fastened, close to the stock-rails, on either side.

I am not aware how it happened that this pair of facing-points was not properly secured with a facing-point lock when this part of the station was opened for traffic in 1874; but I noticed when trying them last week that there was a considerable amount of spring in these points, so that if a small stone, or bit of iron, or dirt got in between the tongue and the stock-rail, the lever in the signal-box might probably be got into its proper notch when these points were not quite close to the stock-rail.

Evidence.

Alfred Young, engine-driver five years, and over 12 years in the Company's service, states: I was driving the 12.5 a.m. down passenger train from Holborn Viaduct station to the Crystal Palace on the 25th instant. My train consisted of a tank-engine, running with the chimney in front, and 10 carriages, including two break-carriages. I was travelling on No. 4 road, until I reached the facing-points north of Ludgate Hill station, whence there is a through crossing to No. 2 road, at the rate of about four or five miles an hour when I reached the facing-points. I felt a little shake or jolt as I was passing over those points,—there is always a little shake in passing over them, more or less,—and when we got to the second pair of facing-points, when our speed had been reduced for the purpose of stopping at the Metropolitan platform, the jolting or shaking had increased, and I thought the engine

had got off the rails. My mate's break had been on for the purpose of stopping at the station, and I reversed the engine, but did not turn on the steam, and the engine got entirely off the road, ran across the west wall of the staircase at the north end of the platform, and the leading wheels of the engine dropped down into the staircase, knocked down the inspector's hut, and the buffers of the engine fouled No. 4 road on the opposite or east side of the main-line platform, and the engine stopped there. We had left Holborn Viaduct at 12.7 a.m., about two minutes late, and this happened about 12.8 a.m.

William Standing, fireman to A. Young, 15 months a fireman, and nearly four years in the Company's service, states: I confirm the driver's statement, which has been read over to me.

Robert Padfield, signalman 20 years, and 13 years in the signal-box at the north end of Ludgate Hill station, states: I was on duty on the night of the 24th and 25th instant, and about 12.6 a.m. I received a telegraphic signal for the 12.5 a.m. down passenger train from Holborn Viaduct to the Crystal Palace from the Holborn station box. I accepted that signal, passed it on to the signalman at the south signal-box, and then put the road right for the train to cross from No. 4 to No. 2 road, the north pair of facing-points being shifted by No. 11 lever, and the second pair of facing-points being shifted by lever No. 3. As the engine was passing over the facing-points which are shifted by No. 11 lever I had my hand on it, and I felt the lever jerked. I thought the engine had struck the points. I was watching the train all the time, and saw the engine jump as it was coming towards me. I was in the signal-box at the time. The train was coming in a little faster than usual. I did not see the engine get right off the rails. After the accident had happened I took my lamp and went down to the points, and I saw that the left tongue of the facing-points had been struck by some wheel, but that tongue was then lying as close as could be to the stock-rail. I could not try the points, as the engine had got among the rods. The coach next to the engine was either partly or wholly off the rails, I am not certain which. Nos. 4, 3, and 2 roads were all blocked, and No. 4 roadway was cleared about 7.40 a.m. for the down boat train.

William Mills, Engineer in Chief to the London, Chatham, and Dover Railway Company, states: I examined the road about noon on the 25th instant, at which time No. 4 road was again in working order. I noticed that the left-hand tongue of the facing-points on No. 4 road had clearly been struck by some wheel, and the left wheel had run for some distance on the top of the tongue and on the succeeding rail, and had then dropped off outside the rail. The right-hand wheel, after travelling between the stock-rail and the right tongue of the facing-points, had bent the rail inwards, the rail succeeding to the right point rail; the two wheels then continued to run, one outside the left rail of the through crossing road, and the other inside the right rail of the through crossing road, and they appeared to have continued to run in that position until they reached the nest of crossings close to No. 2 road, where the leading wheels of the engine diverged sharply off to the left, and ran across the platform and staircase as described by the engine-driver, narrowly escaping running against the uprights of the signal-box. There is no doubt that the facing-points must have been slightly open, or the tongue could not have been hit. I had tried them, and they closed properly. I cannot say what caused them to remain open. They were not fitted with a facing-point lock, although there was a locking-bar in front of them, and in working order. We are preparing a new signal-box, and then all the facing-points at the station will be provided with facing-point locks and locking-bars.

Conclusion.

From the preceding statements it appears that as the 12.5 a.m. down passenger train from Holborn Viaduct station to the Crystal Palace on the 25th ultimo, which consisted of a tank-engine, running with the chimney in front, and 10 carriages, including two break-carriages, was travelling south, along No. 4 road, at the estimated rate of four or five miles an hour, a left wheel of the engine, probably the left leading wheel, struck the left tongue of the facing-points at the commencement of the through crossing road, and heavily marked it, mounted, and ran along the left point rail and the rail next south of it, and then dropped off outside that rail, continued to run for a short distance off the rails, and then swerved round to the left and passed diagonally across the staircase at the north end of the main-line platform, broke down the side wall of the staircase, and knocked down an inspector's box, and finally stopped with the buffers foul of No. 4 road, which it had quitted at the facing-points before referred to. Two carriages are stated to have also left the rails, and Nos. 2, 3, and 4 lines were all blocked.

The accident was evidently occasioned by those facing-points not being in their proper position, with the left tongue close to the left stock-rail, at the moment when the wheel of the engine struck the left point rail, but the points evidently at once closed to the stock-rail immediately after the engine had passed over them, as the carriages at the after part of the train did not leave the rails of the through crossing road. The accident probably would not have occurred if those facing-points had been provided with a facing-point lock.

The Company's engineer, Mr. Mills, stated that they were preparing a new signal-box to supersede the present one at the north end of the station, and when that is brought into use all the facing-points at the station will be provided with facing-point locks and locking-bars.

I have, &c.,

The Secretary,
(Railway Department,) Board of Trade.

W. YOLLAND,
Colonel.

Printed copies of the above Report were sent to the Company on the 22nd February.

LONDON, CHATHAM, AND DOVER RAILWAY.

Board of Trade (Railway Department),
13, Downing Street, London, S.W.,

14th February 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 28th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on that date, between two down passenger trains, at the Snow Hill station of the London, Chatham, and Dover Railway.

I was informed that six passengers in the trains had complained of having been shaken on this occasion, but the collision is stated not to have been of a serious character.

A coupling-shackle and side-chain were broken in No. 80 second-class carriage in the leading train, and three draw-bars of two first and one second class carriage in the following train were broken.

Description.

Snow Hill station is situated just above the junction of the lines from Farringdon Street and Aldersgate Street stations. It is on a steep incline on the line between Ludgate Hill and Farringdon Street stations.

The Snow Hill junction signal-box is in the fork between the lines to Farringdon Street and Aldersgate Street, and about 75 yards from the lower end of the Snow Hill up platform on one side, and 15 yards from the mouth of the tunnel on the line from Aldersgate on the other side. The up platform at the station (as far as the line from Aldersgate Street is concerned) is protected by an up stop semaphore-signal, placed about 20 yards nearer to the platform than the signal-box, and by a disc-signal further back, on the ground, between the up and down lines in the tunnel on the line from Aldersgate Street, and at the distance of about 110 yards from the up semaphore stop-signal, to which it acts as a repeating signal, both being worked by the same lever in the signal-box. The levers of the points and signals in the signal-box are properly interlocked with each other, so that up-signals cannot be given for the passage of up trains from Farringdon Street and from Aldersgate Street stations at the same time. I was informed, when the line from Aldersgate was submitted for inspection prior to its being opened for traffic, that it was intended to allow two up trains to approach the Snow Hill junction at the same time, and I pointed out that it was objectionable, and trusted that it might not lead to collisions.

Evidence.

John Bale, head guard of the 9.28 a.m. London, Chatham, and Dover passenger train from Hendon to Victoria station on the 28th instant, seven years a guard, states: My train consisted of a tank-engine, No. 107, and ten coaches, including two break carriages. We left Hendon at the proper time and reached Snow Hill station at 10.15 a.m. I rode in the front break-carriage, and we got the signal to start at 10.16 a.m. We had cleared the points at the junction when the train stopped at the station. The starting-signal is always off when we are allowed to run into Snow Hill station, and when the signal to start was given by the ticket-collector on the platform the train at once began to move ahead. We had moved ahead about three carriage lengths when I felt a jerk, but I did not know what caused it, and on looking back I found that the carriage behind that in which I was riding had broken away; that the screw-coupling between my carriage and that next to it had broken. The draw-bar of my carriage was drawn out, and the side-chains were also broken, and the after part of the train was running back, and ran against an engine of a following train which was then alongside of the platform. The engine was standing still when the carriages ran back against it. I had not heard any whistle from the engine of the

following train, neither before feeling the jerk nor afterwards.

Walter Bennett Holme, under-guard of the 9.28 a.m. train from Hendon to Victoria, states: I rode in the last carriage. We stopped at about 10.15 a.m. at the Snow Hill station, and the carriage in which I was cleared the trailing-points of the junction from the line from Moorgate Street station by about a carriage length, or perhaps a little more. We stopped about a minute before we started for Ludgate Hill, and after we had started, I saw a train coming from Aldersgate Street station. After I had given the signal to start in the ordinary way I got on the step of my break, and on looking round I saw the Moorgate Street train just coming out of the mouth of the tunnel. I believe the steam was then on. I did not look to see how the stop-signal stood. I did not hear any whistle from the engine of that train, and as soon as I saw that train I got off my break on to the platform and ran towards the coming train. I did not get as far as the end of the platform before the engine passed me. I held up my hands against the coming train, and as the engine passed me I thought the driver and fireman were doing all they could to stop their train. The steam was not on as

the engine passed me. The fireman appeared to be putting on the engine-break as he passed me. I do not know whether the engine was reversed or not. I heard no whistle from that engine. I did not see the guards of that train until afterwards. I think my train must have run ahead about three carriage lengths before the coming engine overtook and ran into it. The coming train was running at the usual rate at which the station is entered. Nothing in my train was knocked off the road by the following engine.

William Cooper, signalman between seven and eight years, and two years in the Snow Hill junction signal-box, states: I came on duty on the morning of the 28th instant at 7.15 a.m., my appointed time being 7 o'clock. As soon as the 9.28 a.m. passenger train from Hendon to Victoria, which is due at my box at 10.3 a.m., passed at 10.15 a.m., I put up the signals behind it. I had received "line clear" from Ludgate Hill for the Crystal Palace train, which preceded the train from Hendon, at 10.7 a.m., and I received the signal from Farringdon Street for the Hendon train at 10.13 a.m., and I sent it on at once to Ludgate Hill. I received a telegraphic-signal from the Aldersgate Market signal-box at 10.14 a.m. for a train leaving there at that time, as I had previously given "line clear" to Aldersgate Market signal-box for a train to come on. The up-signals on the branch from Moorgate Street and Aldersgate Market were both on at "danger" to the best of my belief. The ground disc-signal in the tunnel is used as a stop-signal and repeats the semaphore-signal on the post close to my box; it is supposed to do so. I did not hear any whistle for the train coming from Aldersgate Market signal-box. I noticed that the up semaphore-signal close to my box stood at "danger" as that train passed my box. I did not go out of my box to see how the ground disc-signal stood when the semaphore-arm of the stop-signal stood at "danger." There was a fitter in my box at the time, and I sent him down to the ground disc-signal to see how it stood. I did not touch the lever that moves the up semaphore and ground disc stop-signals before the fitter got to the spot. The fitter went at once and returned to the signal-box, and told me that the signal showed a beautiful red light, and that it was turned against the driver of the train which had run past my box, and the semaphore-signal was at "danger." The fitter is employed to look after and attend to the signals. I could not see nor hear that any breaks were put on as the train passed me. I cannot say whether the steam was on or off. I had not any down train from Ludgate Hill to Moorgate Street about that time. The last down train to Moorgate Street passed the Snow Hill junction box at 10.6 a.m., and the last down train to Farringdon Street passed the box at 10.14 a.m. The signal for the next down train to Moorgate Street was received at 10.54, and the train left at 10.58, and I got "line clear" from the Aldersgate Market signal-box at 10.59 a.m. I had not moved the lever No. 9 that shifts the trailing-points at the junction at the north end of the Snow Hill station, before the train from Moorgate Street ran through them and damaged them.

William Birch, signal-fitter, five years in the Company's service, states: I was in the Snow Hill junction signal-box before 10 a.m. on the 28th instant. The signalman called my attention after the engine of the train had passed his box, and the front carriage in the train was opposite the stop-signal, which was well on at "danger" against the up train. I mean the semaphore-signal. I did not hear any whistle from the engine-driver. I did not notice whether any breaks were on. The signalman called me, and asked me to look at the train running past the "danger" signal. I got up off my knees, looked out, and saw that the signal was on at "danger," full on at "danger." The signalman also added that the train would run through his trailing-points, and be

into the train at the Snow Hill station. I did not notice how the lever stood that moved those points. He then told the boy who books the entries in the train record book to go out and tell the driver of the train not to set back, or he would be thrown off the road. The boy went, and I followed him out of the box, and ran up the tunnel to look at the ground disc in the tunnel. I saw the back light some considerable distance before I got to it. The back light showed a green light. I ran past the ground disc to make sure, and I turned round towards it, and walked back for some distance, and it was showing a good red light. I only walked a short distance in the tunnel before I saw the back light of the ground disc-signal, not so far as the down distant-signal worked from the Aldersgate Market signal-box. I was not more than 20 yards back from the signal-box before I saw the back light of the ground disc-signal, and that signal was not moved until I got to the other side of it, and I saw how it showed towards an up train from Moorgate Street.

Manuel Laundon, signal-fitter, states: I looked at the trailing-points of the two up lines at the junction at the north end of Snow Hill station six or seven minutes after the collision had taken place, and they stood open about three-quarters of an inch, so that on one side they would not close to the stock-rail. The connecting-rod that worked the points from the signal-box was slightly bent. The connecting rod between the two tongues or switches of the points was not bent. The damage to the points was done by the engine running through them while the levers were fastened in the notches in the frame of the signal-box for the straight road from Farringdon Street station. The carriages had been set back before I got to the spot, and two of them were off the road; they were the fourth and fifth coaches from the engine.

Philip Martin, signal-boy, states: I am 13 years of age. I make all the entries in the train telegraph signal book. I was in the Snow Hill signal-box on the morning of the 28th inst. I saw the train from Moorgate Street for Clapham junction run past the signal-box. I have been employed there about seven months. I know when signals are on or off. I saw that the semaphore-signal close to the signal-box was on at "danger" when the train from Moorgate Street for Clapham junction was passing the signal. I did not hear any whistle from that train. The points moved by No. 9 lever were right for a train to come from Farringdon Street, and they were not shifted after the train from Farringdon Street had passed in to Snow Hill station. When the train from Moorgate Street station had passed the Snow Hill junction signal-box, the signalman sent me to tell the driver of the train not to set back, because it would be thrown off the road, but before I got out of the box the driver had begun to set back. Some part of the train stood on the rails between the signal-box and the points. The movement of the train backwards commenced after I was told to go to the driver. I went out of the box as far as the rails, but was called back by the signalman.

James Cook, engine-driver 14 years, and 18 years in the service of the Company, states: I was driving tank-engine No. 63, with 10 vehicles attached, of which two were break-carriages for the passenger train, from Moorgate Street station to Clapham junction, on the 28th instant. I left Moorgate Street station at the appointed time, 10.7, stopped at Aldersgate Street station, and as I approached Snow Hill station the ground disc-signal showed a green light, and I then sounded the small whistle for the guard to take off his break, and the semaphore-signal was on at "danger." When I saw the signal at "danger" I tapped the guards' whistle first—the big whistle, and then I reversed my engine and turned the steam on. My mate put the break on directly I told him. I did

not sound the whistle for the guards' breaks. I had reversed my engine as I was coming out of the tunnel, just before coming out, and I think I might be running about two miles an hour when I ran into the train in front. That train was just moving ahead, and the last vehicle of the train in front was about three carriage lengths from the north end of the platform when my engine struck it. I think the train in front was about two or three carriage lengths ahead when it began to run back towards my engine, and I then told my fireman to take off his break, so as to allow my train to drop back a little. I did not notice how the trailing-points of the junction stood as we ran into the Snow Hill station. I had my engine to attend to, and we dropped back about two lengths of a carriage, as near as I could guess. Two of the carriages, the fourth and fifth from the engine, got off the rails as my train backed. Both were between the points and the signal-box when the train stopped; they got off to the left in running back. I don't know what threw them off. I did not observe the state of the points, nor how they stood. I have never found the ground disc and the semaphore signal differ before.

Daniel Wood, fireman to James Cook, four years a fireman and 10½ years in the Company's service: I confirm the driver's statement, which has been read over to me. I did not see the semaphore-signal by the signal-box.

Robert Wilkinson, head guard of the 10.7 a.m. train from Moorgate Street station to Clapham junction on the 28th instant, nearly six years a head guard, and 12 years in the Company's service, states: I rode in the front break-carriage next the engine. I was on the look-out as we approached Snow Hill station. I was looking out on the left side. The ground disc-signal showed a green light. I did not see the

semaphore-signal. I think we might be running four or five miles an hour when the collision took place. My break was slightly on before we reached the ground disc-signal, and the driver opened the small whistle for my break to be taken off. It was not the whistle that is usually sounded for the guard to put on the breaks. I did not see how the points lay as we ran into the Snow Hill station. I did not do anything while my train was being set back by the engine-driver after we had struck the train in front. I don't know what threw the two carriages off the rails, but I suppose they got off at the points. I tried to see the state of the points, but could not do so. I never knew the disc-signal differ from the semaphore-signal. I am not certain whether I heard the large whistle sounded at all. I certainly did not hear it until we got out of the tunnel.

Frederic Rhyme, under-guard of the 10.7 a.m. train, 3½ years a guard, and six years in the Company's service, states: I rode in the last break-carriage, and was on the look-out on the right side of the train. The ground disc-signal was showing a green light, and my break window was three or four yards from the ground disc-signal when I saw that green light. The semaphore-signal was on at "danger." My break was just a little on before we reached the ground disc-signal, and I took my break off when the driver opened the small whistle, and I was putting my break on again, when we came into collision with the other train, when we might be running about three or four miles an hour. I did not hear the driver whistle for the guards' breaks at all by the large whistle. My carriage stopped opposite to the signal-box, when I got out of my break. I did not look back to see how the signals stood. I have never known the ground disc and the semaphore signals show different signals before.

Conclusion.

From the preceding statements it appears that the 9.28 a.m. London, Chatham, and Dover Company's passenger train, from Hendon to Victoria station, consisted on the 28th January of a tank-engine and 10 coaches, including two break-carriages, and it reached Snow Hill station at 10.15 a.m. and started to leave it at 10.16 a.m. It further appears, that in the act of starting the screw-coupling and the side chains between the first and second carriages were broken, and the draw-bar of the leading carriage was drawn out, and the after part of the train began to run back, and the rear break-carriage came into slight collision with the engine of the 10.7 a.m. passenger train from Moorgate Street station to Clapham junction, which was just then entering Snow Hill station.

The train from Moorgate Street to Clapham junction also consisted of a tank-engine and 10 vehicles, including two break-carriages at the front and rear of the train, with a guard riding in each; and the driver of that engine states that when the train in front began to run back towards his engine he told his fireman to take off his break so as to allow his train to drop back a little, and when dropping back, or setting back, the fourth and fifth carriages in the train got off the rails at the junction points, which had been run through and damaged by this train from Moorgate Street, while the points were set for the previous train from Farringdon Street to Snow Hill and Ludgate Hill stations.

I have already stated that it was intended to allow two up trains to approach the Snow Hill junction from Farringdon Street and from Aldersgate Street stations at the same time, and to depend on the drivers not to run past the stop-signals when these were on at "danger" against them. On this occasion, the evidence as regards the up disc-signal in the tunnel is most conflicting. The engine-driver, fireman, and the two guards of the 10.7 a.m. passenger train from Moorgate Street to Clapham junction all assert that it showed a green light, which would be an all-right signal for the train to proceed on to the Snow Hill station, while the driver admits that he found the semaphore stop-signal, which is only 110 yards ahead of the disc-signal, standing at "danger" against him, these two signals being worked by the same lever. On the other hand, the signalman in the Snow Hill junction signal-box, a boy who records the passing of the trains in a record book, and a fitter who was

working in the signal-box, all positively state that the semaphore stop-signal stood at "danger," and the fitter was sent back into the tunnel to see what light the disc-signal showed, and he states that as he walked back towards the disc-signal the back light from it indicated, and after he had passed the disc-signal the front light showed that it exhibited a red or "danger" signal. The signalman also states that he drew the attention of the fitter to the train running against the "danger" signal at the semaphore stop-signal before he sent him to look at the state of the disc-signal, and directed the boy to go and tell the driver of the train not to set back his train, or it would be thrown off the points, as they had been improperly run through when set for a train from Farringdon Street station.

I am unable to say which of these very different statements is correct. It is also stated that the semaphore stop-signal and the ground disc-signal have never been known to exhibit different signals.

The preponderance of the evidence confirmed by the fact of the trailing-points on the up lines at the junction having been run through and damaged, is in my opinion in favour of the signalman, and against the engine-driver, fireman, and guards of the 10.7 a.m. train from Moorgate Street station.

If this train had been fitted with efficient continuous breaks, placed under the control of the engine-driver, it is probable that the collision would not have occurred.

I have, &c.,

The Secretary,
(Railway Department,)
Board of Trade.

W. YOLLAND,
Colonel.

Printed copies of the above Report were sent to the Company on the 28th February.

MACCLESFIELD COMMITTEE.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., 12th April 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 13th ultimo, the result of my inquiry into the causes of an accident which occurred at Marple Wharf junction on the 11th ult., to a train belonging to the Macclesfield Committee.

In this case, as the 4.20 p.m. passenger train from Manchester to Macclesfield, consisting of engine and tender, a North Stafford break-van, third-class carriage with break compartment, two composites, and third-class carriage with break compartment in rear, was passing Marple Wharf junction, the whole of the vehicles in the train, with the exception of the rear break carriage, left the rails.

One passenger is returned as having been injured severely, and one or two others stated at the time that they were shaken, but have not since made any complaint. The driver's arm was slightly hurt, but not so much so as to incapacitate him for work.

The engine and tender were very little damaged, but the North Stafford van was broken to pieces, and all the other vehicles in the train, except the rear break-carriage, were considerably damaged. (*See Return appended.*)

About 50 yards of the road were displaced, but only 20 chairs and two sleepers were broken, some others being chipped and marked. Two steel rails were badly bent, and an iron guard-rail broken.

Description.

At Marple Wharf junction the joint Manchester, Sheffield, and Lincolnshire and North Stafford line to Macclesfield leaves the joint Manchester, Sheffield, and Lincolnshire and Midland line from Gorton to Hayfield, on the right-hand side.

The junction is five furlongs north of Marple, and one mile one furlong south of Romiley,—the facing points being on the up line from Manchester to the south.

The main line is straight up to the junction, and then on a 2,000 feet curve to the right, and the branch leaves the main line on a curve to the right, with a radius of only 640 feet.

The line falls from near Romiley up to and past the junction, on a gradient of 1 in 150, and then rises up to Marple.

The junction signal-box is 60 yards south of the points.

The permanent way, which is maintained by the Midland Railway Company, consists of single-headed steel rails, weighing 83 lbs. per yard, in 40 lb. chairs, fixed

with two spikes and two trenails to Baltic rectangular sleepers, 9 ft. \times 10 in. \times 5 in., placed 3 ft. apart, and closer at the joints. The fish-plates weigh 39 lb. per pair, and the rails are keyed inside. There is a cant of $2\frac{1}{2}$ in. The engine is a 4-wheel-coupled tender engine, with a wheel base of 14 ft. 4 in. The weights on the three pairs of wheels are:—

On leading wheels	-	-	-	-	tons. cwt.
„ driving „	-	-	-	-	7 8
„ trailing „	-	-	-	-	10 13
					7 12
Total	-	-	-	-	<u>25 13</u>

It was fitted with new tyres on the 20th of February 1877, and has since run 42,876 miles, and the wheels were turned up on the 1st of October 1878, since which date it has run 7,576 miles.

The flanges were but little worn.

Evidence.

Ralph Kirkman, Manchester, Sheffield, and Lincolnshire driver, states:—I was driver of the 4.20 p.m. passenger train from Manchester to Macclesfield on March 11th. The train consisted of an engine, tender, and five vehicles. The train left Manchester to time. I was checked at Romiley by signal. The accident happened a few seconds before 4.39. The first thing I noticed wrong was the engine dropping the leading wheel on the left-hand side. Directly I found something was wrong I was going to reverse the engine; but when I noticed that the North Stafford van, which was the vehicle next to my engine, was likely to mount, I let the engine go on again. I went over the same road in the morning, and all was right. I am sure I got through the points all right. I did not notice anything wrong until I was some yards beyond the points. My engine was a four-wheeled coupled engine, and I had had this engine about three weeks. I did not feel it strike anything, but it appeared to drop off. I think it ran inside the nose of the angle crossing. It is a very steady engine, and takes curves almost as well as straight roads. I was only slightly injured on one arm. I was running about ten miles an hour when the accident occurred. The last stop was at Romiley. I think we left there about a minute late. We were not running to make up time. There was a notice about reduction of speed at this junction, but I do not remember what it was. I always run steadily through this junction in both directions. My break had been on about 200 yards before reaching the points. There was one break-block to each wheel of my tender. There was only slight damage to my engine. I went back to look at the road, but could not see anything wrong, and I cannot account for the accident. The North Stafford van did not come off until after the engine. My engine ran about 80 yards after leaving the rails, and stopped in the angle between the two lines,—off the line altogether.

Seth Tattersall, porter-guard, states:—I was guard in charge of the 4.20 p.m. passenger train from Manchester to Macclesfield on March 11th. The train consisted of engine and tender, a North Stafford break-van, a third-class break-carriage, two composites, and a third class break-carriage in the rear, in which I rode. We left Manchester right time, and Romiley at 4.34, one minute late. I did not perceive that anything was wrong until I was knocked down in my van. I thought we were off the road, and got up to put my break on, when I was knocked down again. I was knocked down three times altogether. I think we were running at about 12 to 16 miles an hour. I had not noticed anything wrong with the running. The engine and tender were in the angle between the two lines. The van was off the road; the next vehicle was on the right side of the line, having been slewed across the line; the two composites turned on to the down line, one being partially turned over; my break

remained on the proper metals, none of its wheels being off. I have several times been with this train before. We were running about the ordinary speed. I had been to Macclesfield once before that day. I had not noticed anything unusual with the road. The couplings were broken between the tender and the North Stafford van, and between the van and the vehicle following it. One passenger got one of his feet through the window of the carriage which was upset, and one or two others complained of being shaken.

John Ashton, fireman to driver Kirkland, states:—I perceived nothing wrong until I felt the engine drop on the left-hand side. We were running at our usual speed, not more than 15 miles an hour. I had just taken off my break on reaching the points. We had run at an even speed, and I had noticed nothing whatever wrong with the road. I did not go back to look at the road. The driver shut off steam outside the distant signal, and I applied my break against that signal. When on the junction points I took off the break, and, so far as I know, the driver never put on steam again.

Charles Larder, Sheffield and Midland joint signalman, states:—I was on duty in the Marple Wharf junction cabin on March 11th. I came on duty at 7 a.m. I watched the train approaching the junction, and after giving "train on line" signal, looked round and saw that it had run off the road. I think the speed would be about 15 miles an hour, the usual speed. The steam was off, and I did not see it put on. I have been at this junction $3\frac{1}{2}$ years, and have never known anything to get off there before. I have been signalman nine years. There was no one in the box with me at the time. I have never had any complaints of trains running too fast through the junction. Driver Kirkland runs at about the same speed as the other drivers. The accident happened at 4.39 p.m., and the train passed Romiley junction at 4.36 p.m.

Peter White, Sheffield and Midland foreman plate-layer, states:—I have charge of the length from Marple to Romiley, about $1\frac{1}{2}$ miles, and was twice over the road on the 11th,—in the morning about 6.30, and in the afternoon about 4.20, and I examined the road on both occasions, but I did not try the gauge. I examined all the points and crossings, and they were right. There were no keys out, no bolts loose, and there was nothing unusual. I saw a Midland train run over the junction before the accident. I am certain the road was right. I tried the gauge about two days before the accident, and it was correct. It was just the same then as it is now, being about $\frac{1}{8}$ th of an inch wide all along. The sleepers were all right. I reached the junction about 4.50, and examined the road. The first mark I saw was between the angles and the crossing on the outside rail. Three

chairs were broken on the Romiley side of the crossing on the right-hand side coming from Romiley. About 18 inches were broken off the end of the check rail at the first angle. The left rail on the branch was knocked out for several lengths; I think three lengths. I could not see anything wrong with the road. There was no obstruction on the rails, and no mark on the top of the rail. I did not see any mark on the top of the fish-plate bolts, but the tops of some of the chairs were chipped. I have never had any complaints about this road, and I have never complained of drivers running too fast over the junction.

Mr. Banks, district superintendent of permanent way, states:—I reached the junction a quarter of an hour after the accident. The first mark I noticed was on the wing rail between the facing points and the first crossing. It was very slight, and it was doubtful to me what it was caused by. The greatest impression was between the first crossing and the angles, where the chairs were found broken. I could trace nothing more until I came to the guard rail, where I found 18 inches broken off. There was then nothing further until towards the back of the crossings, where it was found that the engine had left the line altogether. I have never noticed anything wrong with the road, and

have considered the junction very satisfactory. I have never had any complaints, and, to the best of my knowledge, it was all right. I consider that the road now is in a very satisfactory condition. It varies a little, and is a little uneven; but, considering the nature of the junction, and the speed trains run over it, it is in my opinion satisfactory. I have never particularly noticed the speed of trains over the junction. It is a sharp curve, and I should think ten miles an hour would be a reasonable speed. I do not know the radius of the curve on the branch. I know nothing about the removal of a check rail from the curve. Since I have known the junction there has never been any more check rail than there is now. I have never advised that a check rail should be provided at a junction of this kind. The cant is $2\frac{1}{4}$ inches. I did not notice any loose bolts.

Mr. Sacré, Manchester, Sheffield, and Lincolnshire engineer, said that drivers had instructions not to exceed a speed of 15 miles an hour over the junction.

Driver Kirkland, on being recalled, stated that an order was put up some time since, but he had forgotten to a mile or two what the speed was. He, however, said he knew it was his duty to go over the junction cautiously.

Conclusion.

From the foregoing statements, and the result of an examination of the site, it appears that the 4.20 p.m. train from Manchester to Macclesfield was running at its usual speed, about 15 miles an hour, off the up main line on to the Macclesfield branch, at Marple Wharf junction, when the engine, after passing safely through the facing points of the junction, left the rails of the branch line, and, followed by the tender, ran for some distance off the rails along the down main line, before it left the road altogether, coming to a stand in the angle between the two lines, about 88 yards from the point where it first ran off, and about 66 yards from the point where it left the rails altogether.

The other vehicles in the train took the direction of the branch line, and ran about 90 yards off the rails, fouling both lines of rails on the branch. One of the passenger carriages was upset on the right-hand side of the line, and another was against the bank on the left-hand side. The couplings of the North Stafford van, which was next to the tender, were broken, and the body of the van was broken to pieces.

The first mark of any kind on the up branch line, after passing the facing points, was a slight mark on the top of the first wing rail on the right-hand side, 11' 6" from the north end of it. This mark was 27 yards south of the facing points, but there was no corresponding mark whatever on the left-hand side, and no further mark of any description for a distance of 13 yards, and I do not think that this mark was caused by any vehicle having left the rails at this point.

The next marks were distinct traces of the flange of a wheel running over the tops of the fish-plate bolts outside the left rail of the up branch line, 40 yards south of the junction, and between the point where this rail crosses the right rail of the up main line, and that where it crosses the right rail of the down main line. Nearly opposite to this mark, but a little south of it, was a mark on the top of the inside of a chair on the right-hand side, and the next three chairs on this side were broken. About 18 inches were broken off the north end of the right-hand guard rail, at the crossing of the right rail of the down main line, about three yards further south, and at the back of this crossing there were clear indications where the engine had left the rails altogether, and followed the down main line. From this point the left rail of the up branch line was displaced, up to the point where the carriages came to a stand.

Judging from all these marks it would appear that, in taking the sharp curve off the main line, one of the engine wheels, probably the left leading wheel, mounted the left-hand rail, and dropped off to the left, or towards the outside of the curve, between the first and second crossings, and that on arriving at the latter crossing, the other wheels also left the rails.

It is probable that the vehicles behind the engine kept the rails until pulled off by the engine taking the direction of the down main line.

The engine itself is in good order, and there is no reason to attribute the accident to any fault in the rolling stock.

The speed was, no doubt, at least as much as 15 miles an hour, the authorized speed but, judging from a comparison of the times at which the train passed Romiley and

this junction, and from the evidence, there is no reason for supposing that this speed was exceeded.

The road did not gauge very evenly from the facing points southwards, being in places as much as $\frac{3}{16}$ " slack, and in others exact to gauge. Several of the spikes of the chairs were loose, especially opposite to the first mark on the left-hand rail, and there was noticeable a very considerable play in the sleepers when this part of the road was run over by a train.

I am of opinion that this accident was due to the want of a proper check rail at this curve of under 10 chains radius, and to the somewhat slack state of the permanent way, which is, no doubt, to be accounted for, in some degree, by the exceptionally bad weather which had prevailed for some time previous to the accident.

No time should be lost in providing a check rail at this junction; and, at any rate until this is done, the limit of speed should be reduced to 12 miles an hour; for, situated as this junction is, on a steep incline, drivers will be more likely to run somewhat over than under the authorized speed, whatever it may be.

I have, &c.,

The Secretary,
(Railway Department,) Board of Trade.

F. A. MARINDIN,
Major R.E.

APPENDIX.

RETURN OF DAMAGE TO ROLLING STOCK.

Engine and Tender.—No damage beyond a few marks on the wheel flanges.

North Stafford Break-van.—Body broken to pieces and bottom frame damaged.

Manchester, Sheffield, and Lincolnshire Third-class Break-carriage, No. 219.—2 headstocks, 2 corner pillars, 6 side panels, 2 long foot-boards, 4 doors, 9 leg irons, 3 end lights, 2 quarter lights, 3 bearing springs, and 1 axle broken; 6 short treads broken off, and 1 side cornice damaged.

Manchester, Sheffield, and Lincolnshire Composite, No. 698.—2 doors, 4 door pillars, 5 side panels, 2 end panels, 1 headstock, 2 corner pillars, 1 bottom side, 1 long foot-board, 1 side cornice, 3 quarter lights, and 1 step-iron broken; 1 short tread broken off; 3 step-irons and 2 buffer rods bent.

Manchester, Sheffield, and Lincolnshire Composite, No. 80.—1 headstock, 1 long foot-board, 3 end panels, 3 step-irons, and 2 quarter lights broken; 2 step-irons and 1 buffer rod bent.

Manchester, Sheffield, and Lincolnshire Third-class Break-carriage, No. 194.—Not damaged.

Printed copies of the above Report were sent to the Committee.

METROPOLITAN AND GREAT WESTERN RAILWAYS.

Board of Trade, (Railway Department,)
13, Downing Street, London, S.W.,
1st February 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 27th ultimo, the result of my inquiry into the circumstances connected with the accident which happened to a female passenger in getting out of a first-class carriage, on the 15th ultimo, at the up platform of the Westbourne Park station of the Hammersmith and City line of the Metropolitan and Great Western Railway Companies.

Description.

The up and down platforms of the southern portion of the Westbourne Park station are appropriated for the Metropolitan and Great Western traffic over the Hammersmith and City lines, while the northern portion of the same station are devoted wholly to the Great Western traffic.

The sides of the carriages on the up line form the chords of an arc, whose radius is about 12 chains, so that when the ends of the continuous footboards which are fitted to the carriages belonging to the Metropolitan Railway Company, from whose train the passenger was in the act of getting out, are nearly close to the edge of this up platform, there would be a distance of about five inches between the edges of the continuous footboards and the platform at the centre of the carriage, which is about 40 feet in length, as far as the body of the carriage is concerned, and 42 feet from the ends of the buffers.

The height of this platform above the level of the rails is 2 feet 6 inches. The carriages of the Metropolitan Railway Company are fitted with two continuous footboards, the height of the lower one being 1 foot 11 inches, and that of the upper one, 3 feet 1 inch, while the floor of the carriage is 4 feet above the level of the rails; so that, when there is no cant, the upper footboard would stand about 7 inches above the platform, and 11 inches below the floor of the carriage.

The rails at the Westbourne Park station of the Hammersmith and City lines are

laid with a cant of $3\frac{1}{2}$ inches, in consequence of the curve in the line; and thus the upper continuous footboard would be nearly equidistant from the floor of the carriage and the surface of the platform.

Evidence.

John Bartlett, inspector at the Westbourne Park station, states:—I was on duty on Wednesday the 15th January on the up platform of the Hammersmith and City Railway, and saw the 10.37 a.m. train from Hammersmith arrive at the platform about 10.48 a.m. It was a Metropolitan train, and it consisted of an engine and six vehicles. This train had stopped when I saw a female passenger getting out of a first-class carriage. I am not certain whether it was the second or third compartment from the front end of the carriage. She stepped out from the carriage on to the platform, placing her left foot on the platform, and her knee seemed to give way, and she fell slightly forwards, and her right foot dropped between the footboard and the platform, but she did not drop on to her knees. I assisted her to get up. I think there was not more than two or three inches between the edge of the continuous footboard and the face of the

platform. She was rendered lame by the accident, or at least she was carried into the ladies' waiting room. She told me that she had hurt her leg getting into the train at Shepherd's Bush station that same morning, but I do not know whether the lameness was due to what had taken place at Shepherd's Bush or at the Westbourne Park station. She had a first-class ticket from Shepherd's Bush to Gower Street, and I asked her why she got out at Westbourne Park station, and she replied that her leg pained her so much that she could not go further. One of the porters and myself carried her on a chair to a friend's house at 19, Tavistock Road, so that she might not be subject to the inconvenience of riding in a cab. The doctor who was called in at the request of the lady told me in the afternoon that she was more frightened than hurt, and subsequently he went to Tavistock Road, and was told that his services were not required.

Conclusion.

This accident appears to have been entirely due to some want of care on the part of the lady in getting out of a first-class carriage, the third vehicle from the engine, after the train had stopped, as she informed the inspector on duty that she had hurt herself in getting into the train at Shepherd's Bush, and got out at Westbourne Park station because her leg hurt her so much, and she felt unable to continue her journey to Gower Street station.

No blame attaches in any way to the railway companies concerned, as regards the construction of the carriage, or of the platform or lines at this station, nor to any of the companies' servants.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above Report were sent to the Great Western and the Metropolitan Railway Companies on the 26th March.

METROPOLITAN RAILWAY.

Board of Trade, (Railway Department,)

SIR, 13, Downing Street, Whitehall, London, S.W., 21st February 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 11th instant, the result of my inquiry into the circumstances connected with a collision which occurred on the 7th instant, between a Midland Company's passenger train and a Great Northern goods train, near Granville box, in the tunnel between King's Cross and Farringdon Street on the widened lines of the Metropolitan Railway.

It is stated that complaints have been received from six passengers in the Midland Company's passenger train of their having been shaken, and two of the breaksmen with the Great Northern Company's goods train, which was run into, were injured, one of them somewhat severely.

No damage was done to the Midland Company's rolling stock, and no vehicles belonging to that train were thrown off the rails: but the two break-vans at the rear of the Great Northern goods train were damaged, the rear van having been telescoped into the van in front of it, and its leading wheels were thrown off the road.

Description.

Between King's Cross and Farringdon Street station on the widened lines there is an intermediate block telegraph signal-box, called Granville box, at the south side of the line, where there is a short opening in the tunnel of about 10 yards in length.

This Granville box is 530 yards east of the C. signal-box at the King's Cross (Metropolitan) station. The up platform extends rather more than 100 yards to the east of the C. signal-box, and the up starting-signal worked from this box is 101 yards east from the centre of the box. Granville box, as far as the up line is concerned, is protected by an up home-signal fixed by a bracket to the crown of the tunnel on the eastern side of the small opening in the tunnel, and also by an up distant-signal fixed to a bracket on the north side wall at the western end of this, the second tunnel from King's Cross, and distant 169 yards from the Granville box up home-signal. These two signals are interlocked with each other, so that the up distant-signal cannot be taken off until the up home-signal has previously been taken off. The up distant-signal is 260 yards in advance of the King's Cross up starting-signal. The line is level for about 80 yards beyond the up starting-signal: it then falls 1 in 100 for about 206 yards, and from thence it falls 1 in 500 past the Granville signal-box. The traffic is worked on the absolute block system, so that no two trains are permitted, when the regulations are properly observed, to be on the length between King's Cross and Granville box at one and the same time.

Evidence.

Alfred Saunders, signalman in the Granville signal-box, 14 months a signalman, and between three or four years in the Company's service, states: I came on duty at 10 p.m. for an eight hours shift: a Midland goods train for Farringdon Street passed my box at 11h. 21m., and as soon as it had passed I gave "line clear" back to King's Cross signal-box for that train, about 11.21½ p.m. I had then an up Great Northern goods train given on to me, about 11.21½, and it arrived at the box at 11h. 24m., and the engine stopped about four or five yards short of the up stop-signal. I could see it from my box: that goods train stood there eight minutes. I got line clear from Farringdon Street for the up Midland goods train at about 11.31½ p.m., and I gave the Great Northern goods train on to Farringdon Street at once, and when I gave the signal it was accepted and I pulled off the stop-signal and the train started, there was no delay in starting. After about six or seven trucks had entered into the tunnel I heard the goods guards hollering and swinging their hand-lamps, which were showing "danger." I asked one of the goods guards what was the matter, and he said, "Off the road." I then went out of the box to see what was "off the road," and to my surprise I could see the Midland passenger train behind the goods train. It was a very short distance from the mouth of the tunnel. The tunnel was very clear, and I could see the blue head lights of the Midland engine very plainly, two lights: I then went back to the signal-box, and by means of the speaking instrument I asked to have an inspector sent down: that was acknowledged by the man at King's Cross, but it was after I had blocked the road by giving five beats. When I went out of the signal-box to see what was off the road both my up-signals were on at "danger:" when I took off the stop-signal for the Great Northern goods train to go ahead I did not take off the up distant-signal, I had no occasion to do so. Before I went out of the signal-box to ascertain what was off the road I was preparing to clear the line for the Great Northern goods train, but did not do so. I had unpegged the disc, and had either my thumb or finger on the "train on line" key or lever: I had pressed it down, but had not taken my finger off the key, and instead of giving the "line clear" signal by three beats, I gave five beats, which means "block the line." I had not heard any shouting from the guards of the Great Northern goods train when I unpegged the disc, and was about to clear the line for that train. The driver and guard of the Midland train came up into the signal-box and asked me at once to make inquiries how this had occurred. I did not feel justified in telling them how this had occurred: I made use of the words, "I was just about to 'clear,'" and the guard said "very well, I can see all through it." I think there might be three-quarters of a minute between the time when I took off the stop-signal for

the Great Northern goods train to proceed and hearing the shouting from the guards: the five beats given to King's Cross were repeated by King's Cross, but not until I had repeated the five beats. It was acknowledged when I had given five beats the second time. The signal respecting sending the inspector was acknowledged by King's Cross: and I told King's Cross that the Great Northern goods train was off the road: I cannot say whether the driver of the Midland engine made any remark when I said I was about to clear: I did not know when the driver and guard of the Midland train came into my box that any collision had taken place. I noticed the waggons being moved ahead, but it was so slight that I thought it was in the starting of the Great Northern goods train. I saw the side white lights of the Great Northern goods train on the rear break-van from my box as the train moved ahead.

George Morton, signalman in C. box King's Cross: signalman about 7½ years, and 7 years 11 months in the Company's service, states: I came on duty at 7 p.m. on the 7th February for an eight hours shift: the Great Northern up goods train passed my box at 11.23 p.m., and the Midland up passenger train was due at 11.25 p.m.: it was signalled on to me from the Midland junction at 11h. 27m. p.m., and it arrived at 11.29½ p.m., and left at 11.31: I had kept it waiting until "line clear" was received from Granville box, and I received "line clear" from Granville at 11h. 31m. p.m. After receiving "line clear" I acknowledged the signal, gave the train on to Granville box, which was accepted, and I took off the signal for the train to proceed at 11.31, and it left at that time. About 11.34 I received five beats on the bell from Granville box: I acknowledged the five beats. I believe Granville box had given five beats twice, but I did not answer it immediately, as I did not know what the signalman was doing: I asked on the speaking instrument, "Why he was blocking the line," and he replied, "Great Northern goods off the line." I then went out of the signal-box and saw some one coming from the direction of Granville box with a hand-lamp showing a red light. This proved to be the Midland passenger guard. I asked what was the matter, and he said they had come into collision with the goods train at Granville box, and I asked him if they had run past the signal-box, as I had had "line clear" for the goods train, and he said no, but that it was close to the box. The Granville signalman did not, on the speaking instrument, ask to have an inspector sent down either before he gave five beats or afterwards: I could not see the Granville box up distant-signal from my box.

John Hamment, engineman, seven years a driver, says: I was driver of No. 76 up Elephant and Castle

coal train. My engine is No. 116, a radial axle tank engine fitted with the vacuum break. The continuous break was not attached to any vehicle in the train. We stopped at York Road Great Northern station some minutes, the signals from the Metropolitan line being against us. The signal at York Road was lowered and we went down the tunnel. The next signal is at the east end of the Metropolitan Company's King's Cross platform (that at which Great Northern passenger trains stop), this was at danger when I first saw it. I did not whistle for it, but as we approached the platform it was changed to green, and we went on at the usual speed without stopping, and passed the Metropolitan Company's King's Cross signal-box and platform at a rate of about five to six miles an hour. After passing the platform and getting into the tunnel I saw the distant signal of the Granville box at danger, and at the same time I saw the home-signal of the Granville box; they were both at "danger." The tunnel was clear at the time. I shut off steam when passing the platform, and passed the distant-signal of Granville box at about the same rate of speed—five miles an hour. The break of my engine was then applied, and the train brought to a stand when my engine was about an engine's length within the home-signal of the Granville box. I did not pass it. There was no difficulty in stopping and I could easily have stopped in half a train's length after sighting these signals had it been necessary to do so. When the train stopped the front of my engine would be opposite the Granville box. We were running tank first as usual. Where I stood I should be about a yard on the King's Cross side of the signal-box. I had no conversation with the signalman. I do not remember whether he had his window open or not. I think not. I did not take time by looking at my watch, but I think we must have stood still from seven to eight minutes. I had no communication during this time with the signalman. Neither my mate nor I left the engine. I do not remember whether any trains passed on the other line of rails whilst we stood at the box. My engine commenced to blow off steam soon after stopping, and continued to do so whilst we were opposite the box. It had not thrown out any smoke, but I could not prevent it from blowing off steam. The signal was lowered for me to start and I started. I did not hear the Midland train approaching but I felt something strike the rear of my train. My engine was in motion before this collision took place, but I am not sure whether the breaks of the train would have got into motion, this depends whether the couplings were tight or slack, and I do not know whether the breaks of the vans had been hard on or not, so as to keep the couplings tight, if not they would be slack couplings, as my engine break had been put on. We started easily and all right. Just after the engine got into motion the collision took place. I had the break put on my engine and stopped. We had not gone a train's length before we stopped again. After having stopped I got off the engine and went back towards the rear of my train in the 6-foot space. I met guard Pearce of my train. He told me that we had been run into by a Midland train. I went back to the breaks, and saw that the rear break had been driven into the other, and that the front wheels of the rear break were lifted off the rails. Whilst we were talking the Midland driver came up and said, "the signal was off for me to leave King's Cross Metropolitan." I then went back to the Granville signal-box and I said to the signalman, "How is it this has occurred?" He said, "The King's Cross signalman must have sent the train on; I did not give line clear." I saw that the down road was not foul. I asked the signalman to get us some assistance as we could not go on. He said he would telegraph to the Metropolitan Company at Edgware Road for assistance. The signalman was then out of his box on the ballast. After this he returned to his box and I went back to my engine. We waited there until the Metropolitan Company's people came, and I assisted

them to get the two vans separated from each other. This was very difficult as the vans were double coupled, and the couplings were twisted by the collision. After the rear van had been put on the rails we went forward to Farringdon Street, and had the wheels gauged. They were found to be all right, and we went forward with the train and the damaged vans to the Elephant and Castle. I was not injured by the accident, nor my fireman, nor was any damage done to my engine. On passing King's Cross Metropolitan I looked back along the off side of the train and I saw the white light of the side lamp of the break-van, it was burning brightly. I did not look along the other side of the train, and do not know whether my fireman did or not. I do not know whether the Granville signalman did telegraph for assistance or not. I cannot remember whether I looked back along the side of my train when we were starting from Granville box. The tunnel was full of steam from my engine.

Goods guard *Samuel Pearce*, two years, and five years in the Company's service, states: I was in charge, and in the front break, both breaks were, as usual, at the rear of the train. I worked the No. 76 up Elephant and Castle coal train, due to leave King's Cross goods yard at 10.43 p.m. on the 7th instant. We left the King's Cross goods yard at 11.13. We were 27 minutes late on the previous down journey. The up train consisted of engine 116, Driver Hammond, *nine loaded coal waggons, and two breaks*. I rode in the front van, Breaksman Henry Head rode in the rear van. We worked very well to Granville box, Metropolitan Railway. I saw the King's Cross Metropolitan home-signal at danger when we were running into King's Cross station. It was pulled off before the engine reached it. I saw the red light and then saw it had been changed to a green light. We did not stop at King's Cross Metropolitan station. I am certain as to that. We ran through the station at a speed of four or six miles an hour. Approaching Granville signal-box I saw that both the distant and home signals were on at danger. The driver shut off steam and I applied my break to steady the train down to the box. The signals remained on and we stopped at the signal-box. When we pulled up the rear of the train was between the distant and home signals, nearer to the latter. I calculate from the length of the train that the engine would be in the open space between the tunnels and opposite the signal-box. I looked at my watch directly we stopped. It was 11.24 p.m. I was sitting in my break when my driver gave a short sharp whistle which indicated to me that the Granville stop-signal had been pulled off. There was too much steam at the mouth of the tunnel for me to see the signal myself, I heard my engine blowing off steam. We started again after a detention of seven or eight minutes: we started immediately the sharp whistle was sounded. We had hardly moved far enough to tighten the couplings when we were run into behind. I do not know the exact time when we started. I was knocked from one end of the break to the other. It was break 10,929, an open-ended break. Rear break was 11,071, also open-ended. My hand-lamp was knocked down with the face downwards so that I was in darkness. As soon as I found it I applied my break and shouted as loudly as I could to the driver to stop. I looked at my watch as soon after I recovered myself and before I called to the driver, but I do not recollect the time. My mate shouted as well, and we succeeded in stopping the driver before the rear of the train had reached the signal-box. I tried to stop because the rear break had been telescoped into mine. I got out of the break as soon as I found the train was stopping, before it had stopped, and saw that we had been run into by a Midland train. The Midland driver came to me and asked if we had broken loose. I said that we had been waiting signal, that he had run into us as we were starting. He said the signals were off for him at King's Cross. My break was a good deal damaged, the rear van having been driven into it. The rear

van was not much damaged but the leading wheels were lifted up in consequence of having mounted my van. My break remained on the road. I told the Granville signalman to block the up line, the down line was not fouled. The signalman at Granville box said to me that he had not given "clear" for the Midland to come on. I cannot say in what position the Granville box distant-signal was at the time of the collision. It was behind us. I cannot speak as to the home-signal either. I am very much shaken and so is my mate, Breaksman Head. I was guard of the down empties train which broke loose near Granville box about three or four months ago—when we were run into by Great Northern. We got clear at 1.10 a.m. We were put right by Metropolitan Company's break-down gang. Before starting from King's Cross goods yard I looked at the tail lamps, and both side lamps of my train, they were burning well. They had been trimmed and lighted afresh at 9 p.m. Soon after the collision I looked at these lamps, the tail lamp was out—cistern had been knocked upside down. Near side lamp was out—not damaged. The other was burning brightly. My mate had got it off and put it on the ground. I did not know of the Midland train coming until the collision occurred. I heard no whistle from the Midland engine—heard the driver's whistle in starting our train. My break was off, and my van was in motion when the collision took place. I was very much shaken at the time and was off duty for three days. I was looking towards my engine at the time of starting, but I did not look behind. I cannot speak as to the speed at which the Midland train was running—it might be six or seven miles an hour: it was a smart blow.

Henry Head, breaksman of the Great Northern goods train: I rode in the rear break-van. I think we stopped at Granville box about 11h. 30m. p.m. and stopped there about 8 or 10 minutes: I knew that the stop-signal was on at danger against us. I was in my van when the collision took place, and I saw the other train coming at about half a minute or a minute before the collision occurred. I had not time to get out of my break: there was no whistle from the engine of the train that ran into my train: I did not see the engine of that train until it was about six or seven yards from my van. The tunnel was full of steam, and although I was looking out of my break all the way from King's Cross I could not see the lights of the coming engine until it was about six or seven yards from my van. The front wheels of my van were driven up into the break in front and they were thrown off the rails. The buffers of my van were bent. I was in the act of getting out and was knocked down and hurt and have not been enabled to go to work since. This is the first day that I have been out of the house. I had two side lights and one tail light on my van, and they were burning when we stopped at Granville box.

George Mather, engine-driver 11 years, and 18 years in the Company's service, states: I was driving engine 207, tank engine with the 11.1 p.m. Midland up passenger train from Tottenham to Moorgate Street station: I had six vehicles, including two break carriages, with two guards, one riding in the front and the other in the rear break carriage in the train: we got to King's Cross Metropolitan station about five or six minutes late, and when we got there the up starting-signal was on at "danger." That signal was taken off for us to leave. Directly after we had started I saw the Granville box up distant-signal, and it was on at "danger:" and I passed it, running at about four miles an hour. I could not see the Granville stop-signal from the steam in the tunnel. I was running with the steam off when we passed the up distant-signal, and I was running rather slower than four miles an hour when the collision took place. It was not until I was within five or six yards of it that I saw the tail light on a train in front. When I saw the tail light I reversed the engine and turped on the

steam. My engine was not thrown off the rails, and no damage was done to it. I believe no damage was done to any carriages in my train. I do not know exactly when the collision happened. When the collision occurred I got off the engine and looked forward, and I went forward to the rear break of the Great Northern goods train, and saw that the down line was not fouled. I came back to the front guard of my train and told him what had occurred, and said I should like him as soon as he was at liberty to go with me into the signalman's box to hear what the signalman had got to say about the occurrence: he went with me to the signal-box, and I asked the signalman how it had occurred, and he said he had pulled off the signal for the Northern goods, and looked out and saw the breaks coming and gave "clear:" directly afterwards the guards called out, "Hold on, we're off the road." We then came out of the signal-box and went back to our train. I did not whistle when running between the Granville up distant-signal and the spot where the collision took place. I told my fireman to put on his break a short distance before I got to the Granville up distant-signal, and he put it on, I cannot say whether he kept it on or not, and we slackened speed, and I suppose we were running at from three to four miles an hour when the collision took place. It was clear in the tunnel for some distance after I got past the up distant-signal, and I think the Great Northern break-vans stood a very short distance inside the steam. I did not expect to find any obstruction between the up distant and stop signal, and I had slackened the speed on finding the up distant on at "danger" against me. It is not an unusual thing to find the Granville up distant-signal on at "danger" against us. I have never found an obstruction there before, and, except that there had been a second train in the same section, I had sufficient control over my train to have stopped it at the up stop or home signal. We are guided by the Metropolitan Company's rules. There is no rule requiring me to whistle when the distant-signal is on at danger.

John Garrison, fireman five years: I was firing for George Mather on the 7th February: I do not know what time it was when we started from the Metropolitan King's Cross station: the starting-signal was taken off for us to leave: the Granville up distant-signal was on as we passed it, and we were running at the time at the rate of five or six miles an hour: I could not see the Granville box up stop-signal before we entered the tunnel, and I did not see any tail lights on a train in front before we entered the tunnel. We saw the tail lights of the train when we might be five or six yards from them and we were then running about four miles an hour. My mate reversed the engine, turned on the steam, and I applied the engine break tighter. We were running at that time with the steam off: the driver shut off the steam when about the middle of the first tunnel, before we reached the up distant-signal, and I applied the engine break before reaching it, and afterwards also, and I kept it on afterwards.

Philip Charles Michel, guard 10 months and 6½ years in the Company's service: I was under guard of the 11.1 p.m. Midland up passenger train from Tottenham to Moorgate Street on the 7th instant, and rode in the front break carriage next to the engine: I do not know at what time we left King's Cross station: I saw that the up starting-signal was against us when we arrived at King's Cross station, and it was taken off for us to leave: I noticed that the up distant-signal was on at danger, and I put my break on as we passed it, and we did not run faster than five or six miles an hour. I was on the look-out on the right-hand side of my break for the Granville semaphore signal, and when doing so I noticed an unusual red light in front of us and immediately afterwards the collision occurred, and we were not running then at more than four or five miles an hour. My break

was on at the time. I did not hear any whistle from our engine. I am not aware of any damage having been done to my train. I do not know when the collision occurred. I went with the driver into the signal-box. We asked the signalman at the Granville box if he could give any information as to how the collision had happened: he said he had lowered the signal for the Great Northern train to pass, and when the engine had passed and he saw the breaks following, he had given "line clear," and immediately afterwards he had heard the Northern guards calling out "Off the road."

Walter West, head guard of the 11.1 p.m. up passenger train on the 7th instant; 2½ years a guard and 7½ years in the Company's service, states: I

rode in the last break carriage: we left King's Cross Metropolitan station at 11.31. The signal was against us when we arrived there and it was taken off before we left. I had no warning whatever, and I only became aware that something was wrong by the collision taking place. I think we were running about four or five miles an hour when it happened: my break was on at the time. I saw that the back signal was on at "danger." I did not see the stop-signal ahead, neither did I see the tail lights. I think the collision occurred about 11.32 p.m., but I did not look at my watch at the time. I did not hear anyone complain of being hurt at the time. The speed was reduced to four or five miles an hour before the collision took place.

From the preceding statements it appears that on the 7th instant a Midland up goods train passed the Granville box on its way to Farringdon Street station at 11h. 21m. p.m., and in due course an up Great Northern coal train, on its way to the Elephant and Castle station, arrived from King's Cross (Metropolitan) and stopped in obedience to the stop-signal at the Granville box about 11h. 24m. p.m., in consequence of "line clear" not having been received from Farringdon Street for the previous Midland up goods train.

The Great Northern up coal train stopped there seven or eight minutes, and the Granville box signalman then, after he had given the signal for the Great Northern up coal train to proceed on to Farringdon Street, took off the stop-signal, he having received at 11h. 31½m. p.m. "line clear" from Farringdon Street for the Midland up goods train. The Great Northern up coal train had actually started, and was moving slowly ahead, when it was overtaken and run into by the 11.1 p.m. Midland up passenger train from Tottenham to Moorgate Street station, which was travelling at the estimated speed of from three to five miles an hour, when the collision with the rear van of the Great Northern up coal train took place, 88 yards inside the Granville box up distant-signal, which was on at "danger" as the Midland passenger train passed it, and 81 yards from the Granville box up stop-signal ahead.

The rear break-van of the Great Northern up coal train, which consisted of a tank engine, No. 116, nine loaded trucks, and two break-vans at the rear of the train, was forced into the break-van in front of it, and had its leading wheels off the rails. But the Midland train was not damaged.

The evidence of the signalmen in the King's Cross Metropolitan C. box, and the Granville box, is most conflicting, as to which of them had made the mistake that permitted the Midland up passenger train to leave King's Cross Metropolitan station while the Great Northern up coal train was standing waiting for permission to go on at the Granville box. The King's Cross C. box signalman distinctly asserts that he received "line clear" for the up coal train from the Granville box at 11h. 31m., and at once sent the Midland passenger train on. On the other hand, the Granville box signalman positively states that he did not give "line clear" back to King's Cross C. signal-box for the Great Northern up coal train, although he admits that he "had unpegged the disc, and had either my thumb or finger on the 'train on line' lever, and had pressed it down, but had not taken my finger off the key; and instead of giving the 'line clear' signal by three beats, I gave five beats, which means 'block the line.'" It is impossible that I should say who made the mistake, but I am bound to state that I think it was made by the Granville box signalman. Both are stated to be good signalmen.

Hence the collision was caused by a failure in the working of the absolute block system by one or other of these signalmen having made a mistake; and there is no doubt that failures of this kind are not unfrequent, and that they may be avoided by the introduction of mechanical means that will prevent signalmen from making this kind of mistake.

In this case, as the distance between the two signal-boxes is short, a similar mistake in future might be prevented by allowing the King's Cross up starting-signal to be slotted from the Granville box at a distance of 429 yards, so that no up train could start from King's Cross without the consent of the Granville box signalman, unless the engine-driver disobeyed and ran past the starting-signal at danger.

In the meantime, however, until these have been adopted, the public will be subjected to risks, especially when the working is mostly in tunnels, from the Company's regulations and the mode in which signals are permitted to be passed while

standing at danger. I have already stated that the up line at Granville box is protected by a home or stop-signal, and by a distant-signal 169 yards from the stop-signal; this distant-signal being only 260 yards from the King's Cross up starting-signal.

It is stated that up trains frequently find the Granville box up distant-signal at "danger" as they pass it, and it would be so kept until "line clear" had been received at that box for the preceding up train, so that in all cases it only means to an engine-driver that the preceding train was still travelling on the next block section ahead of that which he is on, and in consequence that he must stop at the up home-signal, and he regulates his running accordingly.

The Company's regulations (part of 242, page 60) say respecting distant-signals: "Should one of these signals be at danger, the driver must be prepared to stop at the signal, and then move slowly on (so far as the line may be clear to enable him to do so) to the next junction-signal, intermediate signal-box, or station-signal." The driver of the Midland up passenger train was told by the taking off of the King's Cross up starting-signal, that the section was clear up to the Granville box, and when he found that the Granville box up distant-signal was on at "danger" against him, he was warned that the next section ahead was not clear, and that he must regulate his running so as to stop at the up home or stop-signal at the Granville box. He could not see through the tunnel for the steam, and he could not see the Granville box up home-signal, nor the tail lights on the Great Northern up coal train, which were 80 yards nearer to him than the up stop-signal. The driver did what he was in the habit of doing, shut off the steam and reduced his speed so as to stop at the up stop-signal, and when he is six or seven yards from the tail of the coal train, when it is too late, he sees the tail lights and cannot stop his train. I cannot blame that driver. The collision was, as I have already stated, the result of a mistake made by one or other of the two signalmen combined with the insufficient arrangements of the Company in not having provided means by which the driver of the Midland train might be made aware of the fact, that a coal train had been stopped, and was still standing at the Granville box. Failing this the Company's regulations should be changed, and should prohibit drivers from running past danger-signals wherever they may be exhibited.

If the Granville box up distant-signal were altered so as to show "all right," "caution," and "danger" signals, this collision need not have occurred, notwithstanding the mistake made in the block working by one or other of the signalmen.

I have, &c.,

The Secretary,
(Railway Department,)
Board of Trade.

W. YOLLAND,
Colonel.

Printed copies of the above Report were sent to the Great Northern, the Metropolitan, and the Midland Railway Companies on the 17th March.

METROPOLITAN DISTRICT RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., 25th February 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 29th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 9th January to a London and North-Western passenger train, when travelling between the Blackfriars and Temple stations, on the Metropolitan District Railway.

No persons were injured on this occasion.

The chimney of the tank-engine which was drawing the train came in contact with the under-side of a girder or girders, and the ferule at the top of the funnel was broken; the barrel of the funnel received a severe blow, and the whole of the rivets fastening the barrel of the funnel to the socket on the top of the smoke-box were broken.

Description.

The drawings supplied to the Board of Trade prior to the opening of this portion of the Metropolitan District Railway, which was constructed as a covered way, show that the height between the level of the rails and the under-sides of the

iron girders that supported the covered way was intended to be 13 feet 6 inches; and I have been informed by Mr. Speck, the locomotive superintendent and engineer to the Metropolitan District Railway Company, that the least height, or the minimum structure of the Company's works, would be found at the Warwick Road bridge, and that it amounted to 13 feet 4 $\frac{3}{4}$ inches. This height was, I understand, supplied to the London and North-Western Railway Company, so that the heights of the chimneys on their engines should be regulated accordingly. I was also told that the heights of the funnels of the engines belonging to the Metropolitan District Railway Company was limited to 12 feet 6 inches, but some of the London and North-Western Company's engines recently constructed have the top of the funnels standing about 12 feet 9 $\frac{1}{2}$ inches above the level of the rails.

Evidence.

Edward Jinks, engine-driver of No. 2287 tank-engine belonging to the London and North-Western Railway Company, 15 years an engine-driver, and 26 years in the railway service, states:—I was in charge of the 11.43 a.m. up passenger train from the Mansion House to Broad Street. I had been driving more than two years to and from the Mansion House, and the 9th January was the first day on which I had had this particular engine on the line. I was running with the coal-bunk in front and the chimney behind. The train consisted of six vehicles including two break-carriages, with one guard riding in the last break-carriage at the tail of the train. We left the Mansion House station at the proper time, and we were running about 20 miles an hour between the Blackfriars and Temple stations, when my attention was attracted by hearing a great noise, as if a piston had broken in a cylinder. I was in the tunnel at that time. It was beyond the first short opening in the tunnel between Blackfriars and the Temple stations when I heard the noise. When I reached the next opening at the side of the line, where there is daylight, I saw that the chimney of the engine was slightly slanting backwards, and I ran cautiously forward, and stopped at the Temple station. The ferule at the top of the chimney had been knocked off, and the base of the chimney had all the rivets broken which secured it in the socket on the top of the smoke-box. It was not bent down so much as to come in contact with the carriage immediately behind it. I took the train on with this engine as far as Addison Road station, and the engine was taken off the train at that station, and I took it on to Willesden. I don't know what height the top of that chimney stood above the level of the rails. There was nothing wrong in going down to the Mansion House that morning on my first trip.

John Teasdale, locomotive foreman in the service of the London and North-Western Railway Company, states that No. 2287 tank-engine was constructed in the early part of 1878. The engine in a disabled state was brought to Willesden workshops on the 9th January, after the accident had occurred. The chimney had been removed when I first saw it. I had the old socket taken off, and placed a similar chimney in all respects fixed in a new socket on the top of the smoke-box, and I measured the height from the level of the rails to the top of the chimney, and found it to be 12 feet 8 $\frac{1}{2}$ inches. I have since had the pieces of the identical chimney which was knocked off put together, and I found that these pieces when put together were three-quarters of an inch longer than the new chimney which I had had

measured when placed on the top of the smoke-box of the engine, and this would make the height from the rails 12 feet 9 $\frac{1}{2}$ inches. I don't know of any arrangement between the two railway companies concerned, that the top of the chimney of the engine should not exceed any specified height, and I don't know how far the minimum structure may be approached in the construction of engines. The engine was new recently. It has run about 13,000 miles and has not been in the shops for repair.

Thomas Samuel Speck, Locomotive Superintendent and Engineer of the Metropolitan District Railway Company, states:—That the London and North-Western Railway Company began to run trains to the Mansion House station in 1872. The engines were to be constructed so as to be suitable for running on the District Railway. The height of the chimnies for our line above the rails is shown on the drawings to be 12 feet 6 inches, and we keep to that height; and the minimum structure supplied to the London and North-Western Railway Company was 13 feet 4 $\frac{3}{4}$ inches. In process of time, and in relaying, the height at one point between the Blackfriars and the Temple stations now appears to be 12 feet 11 $\frac{1}{2}$ inches. I have ascertained that a piece of the funnel of the North-Western engine was picked up 70 feet east of the light-hole between Blackfriars and the Temple stations.

Fred Knapp, states: I am a porter in the service of the District Railway Company and do duty at the Temple station. I was in that capacity on the morning of the 9th January 1879. Directly the London and North-Western train, the engine of which had met with an accident, had left the Temple station, the station inspector told me to get off down the tunnel and see if I could see any broken pieces and remove them if they were on the line. I got a hand-lamp and went with the best speed I could, and about 10 yards on the Blackfriars side of the open space nearest the Blackfriars station I found one large piece of metal, and several smaller pieces; the largest piece was in the 6-foot way touching the metal on the down side; the other pieces were scattered about, the greater part in the 6-foot way. I gathered them together and put them in a heap and went back again. I afterwards took a scuttle, collected them together, and took them to the Temple station, and they were lying at the Temple station for some time, but what became of them I cannot say. To the best of my belief the pieces of metal were the top of the engine chimney.

Conclusion.

From the preceding statements, and from an examination on the ground and of the damaged engine, it appears that while the 11.43 a.m. London and North-Western up passenger train from the Mansion House to Broad Street was running from Blackfriars to Temple station at the rate of 20 miles an hour, with the coal-bunker in front and the chimney behind, the top of the chimney of the engine was heavily struck, pro-

bably by the under-side of one of the girders ; and the whole of the rivets fastening the barrel of the funnel to the socket on the top of the smoke-box of the engine were broken, and the ferule at the top of the chimney was broken.

This appears to have happened about 23 yards east of the first opening for light in the covered way situated about 226 yards west of Blackfriars station, as a piece of the funnel was afterwards found at that spot.

I saw the height of the bottoms of some of the girders measured above the level of the rails. On the western side of the opening for light on the up-line, the height was only 13 feet $2\frac{1}{2}$ inches, while on the eastern side of the opening the height in one case was 12 feet $11\frac{5}{8}$ inches.

The top of the chimney of the engine only measured 12 feet $9\frac{1}{2}$ inches, and of course, if these were the relative heights on the day on which the accident occurred, they would not account for the accident, unless the engine had mounted on something placed on the rails. I was informed that the rails had not been lowered when I saw them subsequent to the accident, but there is no evidence to prove that the engine had mounted anything placed on the rails.

The accident was caused by the Metropolitan District Railway Company having failed to maintain the line of the rails between Blackfriars and the Temple stations according to the minimum structure supplied to the London and North-Western Railway Company, viz., 13 feet $4\frac{3}{4}$ inches.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above Report were sent to the London and North-Western and the Metropolitan District Railway Companies on the 11th March.

MIDLAND RAILWAY.

SIR, Board of Trade, (Railway Department,) 13, Downing Street, London, S.W., February 28th, 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 29th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 16th ultimo at Bradford station, on the Midland Railway.

In this case, during a dense fog, the 10.8 a.m. passenger train (consisting of tank engine and four vehicles), from Shipley to Bradford, while entering Bradford station came into collision with an empty train (consisting of engine, tender, and nine vehicles), standing on the line on which the train from Shipley was running into the station.

No passengers or servants of the Company were injured.

The only damage to rolling stock consisted in the breaking of four quarter lights and a buffer socket in the empty train.

Description.

The Midland Company's station at Bradford is terminal, there being three platform lines used indifferently for either arrival or departure. The levers for working the necessary points and signals are concentrated and interlocked in two cabins; No. 1 being close to the up end of the longest platform, and No. 2 285 yards on the up side of No. 1 cabin. These cabins are in telegraphic communication, there being bell codes, by means of which No. 1 signalman informs No. 2 signalman of the line on which a train is about to leave the station, and No. 2 informs No. 1 of the approach of trains to the station. Thus for a train requiring to leave the down main passenger line at No. 2 cabin, No. 1 signalman gives three beats on the bell; and for a train requiring to leave the outside platform line at No. 2 cabin he gives four beats; No. 2 signalman being in each case required to acknowledge the signals by repeating the same number of beats.

In addition to the telegraphic communication between the two cabins No. 1 signalman has also disc signals working in No. 2 cabin, relating to each line, and one of these ought to be turned off before the signal is lowered for a train to enter the station.

From No. 2 signal-cabin towards Leeds the traffic is worked on the absolute block system.

The lines near the station are practically level.

At the time of this collision, which occurred nearly midway between the two cabins, and on the outside (or No. 1) down line, a dense fog prevailed, and fog signalmen were in attendance at the home-signals.

Evidence.

William Henry Lawson, signalman 12 years, five years in No. 1 cabin at Bradford: I came on duty on January 6th at 6 a.m. for an eight hours shift. The train from Keighley arrived at 10.16 or 10.17. It ran into the station on the outer road. I gave the signalman at No. 2 cabin the signal for the empty train to back out on No. 1 road, viz., four beats on the telegraph bell, which he acknowledged. I lowered the signal—the lower arm on the three-armed post—to allow the train to back out on No. 1, the outside, road. I wished to back the train along No. 1 road because Nos. 2 and 3 roads were occupied by shunting operations. The signalman at No. 2 cabin was not aware that No. 2 line was blocked at this time. The empty train ran past my cabin out of my sight, the weather being very foggy. The fog was so thick that I could not see the bridge at the mouth of the station. The empty train passed my cabin about 10.20 or 10.21. As it was passing I got the "Be ready" signal from No. 2 cabin for the incoming train, and acknowledged it, but I did not take off my signal in No. 2 cabin. About three or four minutes after the empty train had passed I got the "Train waiting" signal, and I then pulled off the disc working in No. 2 cabin for No. 1 road, the road on which the empty train had run out, supposing it to have cleared No. 2 cabin, No. 2 road being still occupied by a departing train. I got no further signal from No. 2 cabin. I had signalled the departing train from No. 2 line to No. 2 signal-cabin before the collision occurred, and the signalman there had acknowledged the signal. I heard the collision occur at 10.24 or 10.25, and stopped the outgoing train by speaking to the driver. So far as I was concerned the empty train took the road upon which I wished it to go.

Cyrus Simpson, signalman 12 years: I came on duty at No. 2 cabin at 6 a.m. for a 12 hours shift. I work absolute block towards Leeds, and between No. 1 cabin and mine there is telegraph bell working. I remember the train from Keighley due at 10.8 arriving a few minutes late. It was passed into the station by the permission of the signalman at No. 1 cabin. The next signal I received after the arrival of the Keighley train was three beats from No. 1 cabin, meaning that a train wanted to back out on the down main line, and I pulled my cross-over road points over and lowered the signal applicable to the down main line to allow it to pass on to the up line then, and back into a siding. The fog signalman on duty at my up home-signals came to me and said, "An engine on the down main line wants to cross the road." I asked him to stop it if he possibly could, because I had a passenger train to come into the station, meaning the train from Shipley, which was at this time standing at my signal, but outside the cross-over road. I cannot say whether I had received the "Train on line" for the incoming train, or the signal from No. 1 cabin for the shunting train first of all. I had signalled the incoming train on to No. 1 cabin, but No. 1 had not taken the disc off in my cabin until I gave him the "Train waiting" signal, and then he lowered his disc, permitting me to allow the train to run in on No. 1 line. The fogman had in the meantime returned and told me that the engine was stopped, and I then said "Go and see if the outside line is clear," and on his coming and telling me it was, I lowered my signal for the train to run in on No. 1 line. The fog at this time was so thick that I could not see anything of my signals. The incoming train then passed my cabin,

and had got out of sight before the collision occurred. The next I heard was the fogman shouting "Whoa!" The time was then nearly 25 minutes past 10. The immediate duty of the fog signalman was at the three-armed post, but he is also employed to see that the crossings are clear. There was a fog signalman on the up side of the cabin as well. I cannot in any way account for the mistake in the bell signalling which occurred between me and the signalman in No. 1 cabin, except that the bell may have omitted to strike once.

John Beckett, platelayer, acting as fog signalman at No. 2 cabin on the station side, said: I came on duty at 7 a.m., and about the time of the collision the fog was so thick that I could not see more than 9 or 10 yards. I remember the train from Keighley running into the station, but I did not see it come out again. The middle arm at No. 2 cabin was lowered for an outgoing train. I could see it because I was underneath it, and about half a minute afterwards it was reversed, and the lower arm pulled off. On returning to the cabin from the signal, the signalman said to me, "there are some coaches on the middle road." He then told me to see if the back road was clear, and I went back, but could not see anything on it. Then I walked a bit further towards the station and heard somebody shouting out "we want to cross the road." I was then returning to the cabin and met an incoming passenger train, and not having time to put down a fog signal I pulled my flags out, and halloed to the driver to hold on, and he tried to stop, but he struck the empty coaches. I met the passenger train on the cabin side of the signals. I afterwards heard from the shunter that there was a train wanting to cross the road, and on going back I saw the coaches standing on the outer line. I then ran back and did all I could to stop the passenger train.

William Calderwood, a shunter at Bradford: I took charge of the Keighley train after it had delivered its passengers. I was in the last van, and wished to go down on the outside road to cross at No. 2 cabin to go into a siding on the other side of the up line. As I passed the signal the proper arm was off for my going along the outer line. The driver stopped with the tail of the train where the collision afterwards occurred, waiting for a signal from me to go forward. On the train stopping I got out of my van and went towards the signal to see if the proper signal was off, the signal being the bottom arm. On approaching the signal I saw the middle arm off, that referring to No. 2 road. I could not see this before I got right under the signal on account of the fog. When I did see it I returned to my van, thinking the signalman was letting something off the middle road. When I was walking back to my van I met the fog signalman and told him we wanted to go down the outside road, and he left me going towards No. 2 cabin. I am confident I told the fog signalman we wanted to go on the outside road. I got back to my van and had been there about two minutes when the collision occurred without any warning. The collision knocked me against the door of the van and hurt me a little. I heard the fog signalman shout "stop! stop!" when the engine was quite close to the van. My train was hardly moved back by the collision, and nothing was knocked off the road.

John Turner, driver seven years: I started from Shipley with the 10.8 a.m. train to Bradford on

January 16th. I was driving a 4-wheeled coupled tank engine, running chimney first. The train was not supplied with continuous breaks. We left Shipley five minutes late waiting for the Tidal train from Barrow. I had a clear run until we came to No. 2 cabin, where, finding the signals at danger, I stopped. The fog was so thick that I could not see the signals until I was close to them. I was standing at the signals for about three minutes, when the top arm referring to the outside road was lowered. I then started at once, and had got past the cabin and the signals when a shout from the fog signalman calling out "hold on" attracted my attention. My speed was about three miles an hour when I commenced to reverse the engine and the fireman to apply the break. We struck the tail of the empty train, but I felt very little of the collision on the engine. I had gone through the points and well on to No. 1 road before I heard the fog signalman shout, and I was close on the van before I could see it. We generally go in on No. 1 line.

Thomas Sturman, guard 15 years : I was in charge of the 10.8 a.m. train from Shipley to Bradford on January 16th. It consisted of four vehicles, viz., a slip carriage and three composites, the slip carriage having a break compartment, in which I was riding. We started from Shipley five minutes late. We were slack by signals at No. 3 cabin, and stopped

at No. 2 cabin, at which latter cabin we were standing from two to three minutes when the signal for No. 1 road was lowered. The fog was so thick that the signals could only be seen when we were close to them. We were proceeding onwards towards the station when I heard a man shouting out "hold on ! hold on !" We were very near the train of empty carriages when I heard the shouting, our speed at the time not being more than four miles an hour. I had just time to put on my break before the collision when the train had nearly stopped. I felt the blow slightly, and was not knocked down. There were a good many passengers in the train, but there were no complaints of injury. The collision occurred at 10.24.

Henry Scott, driver between five and six years : I brought in the 9.40 a.m. train Keighley to Bradford, and was backing the empty train out along No. 1 road and stopped as soon as I was clear of the crossing at No. 1 cabin, waiting to know whether the signal was lowered for me at No. 2 cabin. There were nine vehicles on the train. I think I had waited three minutes when the Shipley train ran into us. I had not previously to this got any signal to proceed. The fog was so thick that we could not see above eight or nine yards. The collision knocked the train from the engine. Neither I nor the fireman was knocked down.

Conclusion.

This slight collision during a dense fog between an incoming passenger train and a train of empty carriages which were standing on the same line as that on which the passenger train was approaching, was brought about by two causes : 1st, there was a misunderstanding between the signalmen in Nos. 1 and 2 cabins (only 285 yards apart) as to the line on which the empty train was being backed out of the station ; No. 1 signalman having signalled this train to No. 2 signalman with four beats of the bell, as proceeding along the outside line, whereas No. 2 signalman was under the impression that he had received only three beats of the bell, and had therefore concluded that the train was coming back on the main down line. The train having passed out of the sight of No. 1 signalman, he, on receiving the "Train waiting" signal from No. 2 signalman, lowered his disc in No. 2 cabin, intimating that the train might enter the station on the outside line, which he reasonably assumed was by this time clear of the shunting train. On this disc being lowered, and on having been informed by the fog signalman that the outside line was clear, No. 2 signalman lowered the signal for the train to enter the station on the outside line, and hence the collision, the driver not having seen the van of the empty train until he was close upon it, the fog signalman having just previously shouted to him to stop.

The second cause of the collision was the imperfect manner in which the fog signalman at No. 2 cabin up home-signals performed his duty. The collision occurred only 70 yards on the station side of the up home-signal post, and had the fog signalman gone back even half this distance he must have seen the van of the empty train standing on the outside line ; whereas he took upon himself to inform the signalman that the outside line was clear, without having used any reasonable means to assure himself that it was so.

As a means of guarding against future collisions of a similar nature, it is worth consideration whether it would not be expedient to make a greater distinction between the telegraphic signals used by No. 1 signalman for trains running out on the main down, and outside lines than is given by three and four beats respectively.

Also, though it would not have affected the present case, it seems desirable that, considering the very short distance between the two cabins, conflicting signals for incoming and outgoing trains should be mutually controlled by the two signalmen.

I have, &c.,

The Secretary,
(Railway Department,)
Board of Trade.

C. S. HUTCHINSON,
Major-General R.E.

Printed copies of the above Report were sent to the Company on the 2nd April.

MONMOUTHSHIRE RAILWAY.

Board of Trade, (Railway Department),

25th January 1879.

SIR,

IN compliance with the instructions contained in your Order of the 17th instant, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the collision that occurred on the 4th instant at Newport, near the Moderator public level crossing of the Monmouthshire Railway and Canal Company's mineral and goods line from Dock Street to Mill Street stations.

A goods train belonging to the London and North-Western Railway Company ran into part of a goods train belonging to the Monmouthshire Railway Company, which was shunting out of the Moderator sidings. The guard of the Monmouthshire goods train was injured by some rails falling on him, which were loaded on the waggon he was riding in. The guard of the London and North-Western train was also slightly bruised.

The engine and tender of the London and North-Western train were damaged. Three waggons of the Monmouthshire train were damaged, and two of them were thrown off the rails. The permanent-way was very slightly damaged.

Moderator sidings and public level crossing are a little more than a quarter of a mile south of Mill Street station, and a little more than half a mile from Dock Street station on the Monmouthshire Railway. There are sidings at both sides of the railway, which is a double line, and the public street crosses the railway at this place: the crossing and sidings are protected by up and down signals, which are placed outside the fouling-points, and are interlocked with the points. The sidings are further controlled with catch-points, and the levers by which the points and signals are worked are placed in a cabin which is close to the public level crossing, intermediate between the up and down stop-signals. The railway from Dock Street curves to the left as it approaches the crossing, and as there are buildings close to the railway the view is very limited for a driver approaching from Dock Street: he cannot see a train moving out of the up siding at Moderator crossing for more than about 50 or 60 yards before he reaches it; but the up signal is a very good signal, and can be plainly seen when the driver reaches Llanarth Street signal, which protects the latter level crossing, and is about 200 yards south of Moderator crossing.

The evidence is as follows:—

Evidence

C. Baker, engineman of the 5.35 p.m. London and North-Western goods train from Newport to Abergavenny, on the 4th January 1879, stated: We left Dock Street at 5.40 p.m. on the date in question, having on six waggons, five of which were loaded and one empty, and the break-van at the tail of the train. My engine was a tender-engine, running engine in front. On approaching George Street crossing, which was the first, I whistled to get the signal pulled "off." At Grenville Street, the second crossing, we slackened to pick up a basket. At Cross Street, the third crossing, the signals were "off." At Llanarth Street, the fourth crossing, the signals were at "danger." I whistled for them, and they were lowered. On approaching Moderator, the fifth public street crossing, my mate said "Right, away;" so I stepped across the footplate, and saw a white light. I then put on steam, and took it for granted that all was right, until I saw the red light of the pilot guard on the waggon of a train that was shunting across the road on which I was running. I tried to stop by shutting off steam, reversing, and whistling for breaks,—my fireman applied the tender break,—but I could not stop, and ran into the other train. The speed we were going at when passing Llanarth Street crossing was about four to five miles an hour. At the time we struck the waggons that speed was reduced. After striking the waggons we ran about five yards. (Note: the actual distance from fouling-point to where the front of the engine stopped

is 15 yards.) My engine was under the wooden bridge, about 37 to 40 yards from the Monmouthshire coal train, when I first observed the danger-signal of the pilotman's lamp. I have been a driver over six years. I did not say anything to the signalman at the time of the accident about his signal showing white. I went back to see, but it was showing red when I went back. I was not hurt, nor was my fireman. We both stopped on the engine until after the collision. The Moderator up stop-signal can be seen as soon as I reach Llanarth up stop-signal.

Thomas Thompson, fireman of the 5.35 p.m. London and North-Western goods train from Newport to Abergavenny, on the 4th January, stated: I recollect leaving Dock Street: we left at about half-past five, and had four waggons and a van on. We came on, passing George Street signals, which were "off." At Grenville Street crossing we slackened to pick up a basket; we then whistled for the signal, and it was taken off. Cross Street signals were "off." Llanarth Street signals were "off." Moderator signal was "off." I first sighted Moderator signal at about 100 yards distance from it. I looked for the signal before passing Llanarth Street bridge; it was then showing a white light. I had no conversation at all with the driver after passing Llanarth Street crossing, until he called out and said, "There is a red light on some waggons." We were then about 12 to 14 yards from

the main cross-over road, and close to the travelling crane which was over the line. When we came into collision with the waggons we were travelling at about three to four miles per hour; we were running not much faster than this all the way up from Dock Street. It is very seldom that we ever get a clear run from Dock Street to Mill Street, but on this night we got a clear run; all the signals were right excepting Grenville Street signal. The signal at Moderator crossing was on my side of the engine, and was burning well. I have never known anything at all the matter with that signal. I misunderstood what you meant for "conversation" when I stated that nothing was said between me and the driver. Immediately after passing Llanarth Street crossing my mate said, "Are we right?" and I said, "Yes; right away." He then stepped across the footplate, and saw that it was so. I have been working between Abergavenny and Newport on the North-Western trains for nearly two years, and I know the road well, and am always on the look-out for the signals, as we are frequently pulled up at the crossings. I was not aware that the points and signals were interlocked before I gave my evidence. I did not hear anyone complain or ask the signalman at the time of the accident why he had given an "all right" signal to my train? I did not look at the signal after the accident. I saw the arm as we passed; it was half-way down.

Matthew Rees, guard of the 5.35 train (London and North-Western goods, Newport to Abergavenny, on the 4th January).—My train consisted of two loaded waggons and two empties, and the van. I am sure the engine-driver is wrong about the load, as I entered it in my book at the time, two waggons, loaded goods, one van, and two empty. The van was in rear of the train. It was 3.40 p.m. when we passed Jack's Pill Box in the station yard at Newport. The open end of my van was towards Dock Street, and not looking over the waggons. I could not see ahead unless I looked along the side. The signal for George Street crossing was at "danger," and my driver whistled it off. Grenville Street signal was "off," and he slackened to a green hand-lamp light to pick up a basket. The signal for Cross Street crossing was "all right." The signal for Llanarth Street crossing also was at "all right." The Moderator crossing signal was at "all right" as far as I could see out of the van. I first looked for the signal just after passing Llanarth Street. I was on the six-foot side in the van. I could not see the signal distinctly, as the night was hazy, and through the steam arising from the engine. So far as I could see, the signal showed a white light. I have been working trains over this line for about three years. Immediately after I looked over the side of my van I heard the engineman whistle for the break; I at once applied my break and looked over the nearest side of my van, and saw a red light ahead, which I took to be on an engine. I should say that the engine of my train was very near to the travelling crane over the line when the driver blew his break whistle. (The proper name for what is termed the "crane" is "Batchelor's gantry," crossing the Monmouthshire line for the purpose of getting timber off the canal boats to the timber yard.) We travelled at a speed of about five or six miles per hour from Dock Street, and were going about four miles per hour when the collision took place. I did not complain nor hear any one complain to the signalman or ask him at the time why he had his signal at "all right." I went to Mill Street at once to telegraph to Abergavenny. I stopped on my van and was slightly hurt in the arm. I have been a guard over six years.

Samuel Sheppard, signalman, stationed at Moderator sidings, in charge of the signal-box and the work there.—I have an assistant who attends to the gates, lifts, bridges, close to my cabin, and does other duties under my instructions; but I work the signals and points from levers which are concentrated in my

signal-box. I recollect the night of 4th January. The Mill Street pilot engine arrived at Moderator sidings at 5.38 p.m. on the night in question. She had a lot of empty waggons on, which were left standing on the down line to Dock Street at the Mill Street side of my box, and clear of the through cross-over road. The engine was detached from the waggons, and ran ahead over the cross-over points, which are at the opposite side of the level-crossing gates, to where the train had been left. I set the main cross-over and siding points to turn the engine into the sidings for the purpose of taking on traffic. (The sidings referred to are situated on the up-line side.) After the guard had got his train all right, they drew out of the siding and stood by the gates at the public crossing, and short of the main cross-over road. The front of the engine was standing near the further gatepost, and the last of the waggons stood on the facing-point on the up line near my box. The normal position of my signals is "danger." Before the Monmouthshire pilot engine left Mill Street she was signalled to me in the usual way, and my down-signal was lowered for her, and then put back to "danger." At the time—5.38 p.m.—that the pilot reached Moderator crossing from Mill Street my up-signal was at "danger." The last up train which passed my box previous to the time the collision took place was the pilot engine from Dock Street, with a train at 4.56 p.m., as recorded in my book. My signal was lowered for that train, and put to "danger" after it passed on to Mill Street, and was not afterwards lowered. I did not interfere with my down-signals between the time of the arrival of the pilot engine at 5.38 until the collision took place, viz., at 5.47 p.m., and I had not altered my up-signal since I placed it at "danger" after the passing of the train at 4.56 p.m. After the pilot engine stopped on the public level crossing, I heard the bell ring from Llanarth Street, denoting that an up train was coming. I shouted from the door of my signal-box to the engineman to run over on to the down line; he started to do so, and he had not proceeded more than 10 or 12 yards when I heard him put on steam on the engine, and within half a minute or so I heard the driver of the North-Western engine put on steam, which I took to be to reverse his engine. One, the tail waggon, had been uncoupled from the train that was brought out of the up siding, and was left on the up line, when the pilot engine and train moved on towards the down line. The main cross-over road, also the facing-point referred to, and the safety-points are interlocked with the up-signal, and the main cross-over road is interlocked with the down-signal as well. The waggons to be sent forward were standing in the middle, No. 2, siding, and up to the catch-point. No one made any remark to me after the collision about my up-signal showing a white light for the London and North-Western train. I saw it at "danger" when I turned the Monmouthshire pilot engine across from the down line to the sidings at the up side. Three waggons were damaged as well as the London and North-Western engine. I have not known the signal fail in my recollection. It always works well: it is close to my box. I walked down to the signal immediately after the collision, and I called the Monmouthshire driver's attention to its being at "danger." I have been a signalman over six years. I gave the driver of the pilot engine a hand-signal and a whistle to go across. The night was clear, and I could see the semaphore arm at "danger." The lamp serves for up and down signals.

William Lee, engineman of Monmouthshire pilot engine.—I recollect the 4th of January. We left Mill Street at about 5.20 p.m. for Moderator sidings with about 10 waggons, and on arrival at Moderator crossing we left them on the main down line clear of the public crossing. We ran over the cross-over road between the down and up main line, and the policeman turned us back into the up line sidings to pick up traffic for Dock Street. We were turned into the No. 1 siding.

I cannot be sure that it was not the middle siding, as my engine stood on the three-throw and catch-points of the sidings. We did not go into the siding beyond the catch-point, as the waggons stood close up to the safety-point. After the engine came to a stand against the trucks, we stood a few minutes whilst the guard looked round them, and I then received a signal to go ahead, both from the guard and the policeman who works the signals and points at the Moderator cabin. I came out of the siding and proceeded towards the down main line. We did not stop on the public level crossing or anywhere else, until struck by the North-Western train. When passing the box the signalman shouted for us to make haste across to clear the North-Western train. The pilot guard was riding on the second waggon from the engine, and was knocked off by the force of the collision. I ran to pick him up, and when doing so I looked up to see the position of the signal, and I noticed that the arm of the up signal was at "danger." When I drew out of the siding I was standing on the right-hand side of the engine, and I had one waggon of goods next the engine, three of rails, and another of goods. I have been a driver three years. The London and North-Western engine was under the wooden gantry close to me when I first saw it. There is a curve in the line, and the houses would prevent my seeing it for more than about 30 yards.

Charles Taylor, fireman of the Monmouthshire pilot engine on 4th January.—On arrival at Moderator crossing from Mill Street we left our train on the down main line, and crossed over with the empty engine to the up-line sidings to pick up traffic. We did not go beyond the safety-points. We stood about two minutes till we had a signal from the guard to go ahead. We brought out four or five waggons. I understood when we started from the siding with the waggons that we were to go right on to the down line. I did not notice the up signal when we drew out. I did not hear the North-Western train coming on, as I was on the 6-foot side, but I heard the train before the collision took place. I heard nothing at all about our shunting into the up-line sidings to let the North-Western train pass. I saw the pointsman as we were going into the sidings. He was standing outside his cabin with his hand lamp, but I did not see him as we were coming out. My engine did not go inside the safety-points, as the trucks were close up to the points. I and my driver stopped on the engine and were not hurt.

George Wyatt states: I was pilot guard on duty on the 4th instant with the Monmouthshire train. While going over the cross-over road at Moderator crossing at about 5.45 p.m. on Saturday last (4th), with three Patent Nut and Bolt Company's waggons,

loaded with rails, and one Great Western goods waggon, the goods waggon being next the engine, the points were worked from the box, and as the engine was just on the down-line points, the 5.25 p.m. London and North-Western goods, ex Dock Street, ran into the waggons loaded with Patent Nut and Bolt rails, and knocked the trucks off the road. I was riding on the break-rack of the Patent Nut and Bolt Company's second truck to unhook the rails on the down line to shunt them back on to my train, which was on the down line, and I was knocked off, and several rails fell on me, and my leg and arm were badly bruised, and my body is scratched and bruised in other places, and my uniform torn to pieces. I was taken out of the debris into the pointsman's box. Mr. Burton sent for a doctor, who ordered me to be taken home at once. I have had medical advice since, and my wounds are dressed. I am ordered to be kept still, but I hope to resume work again in about a fortnight or three weeks. I noticed that the Moderator crossing signal was at "danger" for up trains before moving out of the siding, and the signalman told me by word of mouth that we could go out of the siding to make our shunt. We brought five waggons out of the middle road, and I unhooked the last when the train stopped for an instant, and then I signalled the driver to go ahead, and I ran and jumped on to the second waggon of rails. The waggon that I unhooked was partly on the up road; it had passed over the three-throw points. After putting the waggons of rails on to my train I intended to put the two waggons of goods together. I have been a guard three years. It was after unhooking the waggon that I observed the up signal at "danger." I think we had been about six or seven minutes at Moderator crossing when the collision occurred. I had remained no time in the sidings except what was necessary to hook on the waggons. I did not observe the up signal before the engine crossed to the up sidings. The pilot was a tank engine. I was at the six-foot side of the waggon of rails when I was knocked off. I stopped my driver with my lamp to unhook the waggon.

A. Howell, traffic inspector, states: Two waggons of rails were thrown off the rails, and three were damaged. Permanent way was slightly damaged.

J. Hill, locomotive foreman, states: The London and North-Western engine and tender were also damaged, but it was not thrown off, nor any vehicles of this train.

J. D. Roberts, Esq., C.E.—The distance from Llanarth crossing to Moderator crossing stop-signal is about 200 yards; to Llanarth stop-signal it is about 300 yards.

Conclusion.

The London and North-Western train consisted of an engine and tender, two loaded, two empty waggons, and a break-van with the guard in charge at the tail of the train. It left Dock Street at about 5.35 p.m. The driver, fireman, and guard in charge of this train, all stated that the Moderator crossing up stop-signal was at "all right" when they sighted it, and the driver further stated that the first thing he saw of his danger was a red light exhibited by the guard of the Monmouthshire train, who was riding on the break handle of the third waggon from the engine of that train, but this driver admits that when he went back to look at the "stop" signal after the accident it was standing at "danger."

The Monmouthshire train had arrived from Mill Street, and was stopped at Moderator sidings, where the train was unhooked from the engine and left on the down line, while the engine went across into the sidings at the up side of the line, and brought out one waggon of goods, three waggons of rails, and another waggon of goods, coupled together in the order in which they are given. It drew these waggons out on to the main up line, was checked there for an instant by a signal

from the guard of the train, who then unhooked the last waggon of goods, and signalled his driver to draw the rest of the waggons across to the down line for the purpose of putting them back to his train. While crossing towards the down line the second waggon of the train was run into by the engine of the London and North-Western train. The man on duty at Moderator crossing signal-cabin, as well as the driver and guard with the Monmouthshire train, stated that the up home-signal was at "danger" when they were moving from the sidings towards the up line; and from the arrangements of the locking apparatus, which is in good order, and has not been altered since the accident, it is absolutely necessary that the lever handle which works this signal should be in the position to put the signal to "danger" before the signalman can set the points for the train to draw out of the sidings and to cross from the up to the down line. The signalman stated further that this signal had been placed to "danger" after an up train had passed at 4.56 p.m., and had not been lowered from that time up to the time when the collision occurred. The examination of his books to see what trains had passed, bears out his testimony to that effect.

The railway between Mill Street and Dock Street is crossed by six public streets, the crossings are in each case guarded with "stop" signals, which are always kept at "danger," unless they are required to be lowered for passing trains. There are no distant-signals, as the distance apart of these stop-signals is only from 200 to 250 yards, and no sooner is one signal reached than the other can be seen.

The accident appears to have been caused by the neglect of the engine-driver of the London and North-Western train, who failed to observe the position of the Moderator crossing up home-signal. There does not seem to be any probability that this signal stuck fast or failed to answer the movement of the lever. No complaint or fault has been observed in the working of this signal within the recollection of the parties concerned in the accident, or of the engineer in charge of the line, and the London and North-Western engine-driver made no remark at the time of the accident that the signal was not at "danger."

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. H. RICH,
Colonel, R.E.

Printed copies of the above Report were sent to the London and North-Western and the Monmouthshire Railway Companies on the 13th February.

NORTH BRITISH RAILWAY.

SIR,

Glasgow, 1st April 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 30th January, the result of my inquiry into the circumstances connected with the collision which occurred on the 25th January, between Garngaber junction and Avenue Head, on the Garngaber mineral (single) line of the North British Railway system.

In this case, the 2.45 a.m. up mineral train (consisting of engine, tender, 32 empty waggons, eight loaded waggons, and a guard's break-van), from Garngaber through Avenue Head for Kipps, came into collision (engine to engine) with the 3.45 a.m. down special mineral train (consisting of engine, tender, 24 empty waggons, six loaded waggons, and a guard's break-van) from Summerlee through Avenue Head and Garngaber for Garscube. The driver and fireman of the down train were seriously injured; the former in the head and shoulders, and the latter had his thigh broken.

The engines and tenders of both trains were thrown off the rails and much damaged. Twenty-six waggons were more or less knocked about, seven having been entirely destroyed. The cost of making good the damage amounts to nearly 3,000*l*.

Description.

The single line between Garngaber junction (on the Edinburgh and Glasgow line, about six miles from Glasgow) and Avenue Head is rather more than three miles in length, and is worked with Tyer's block-telegraph instruments, of which there is one in the junction cabin at Garngaber, and another in that at Avenue Head, where the single line merges into a double line. The line is used only for mineral traffic. Each signalman keeps a train register.

In Garngaber cabin there are 29 levers for working the different points and signals, and block instruments for the main line, in addition to that for the single line. In Avenue Head cabin there is only one block instrument for the single line, and home and distant signals in each direction; the Garngaber signalman is, therefore, much more busily employed than the one at Avenue Head.

The whole of the single line is very tortuous, and on part of it the gradients are sharp.

The collision occurred about three-quarters of a mile from Garngaber junction, at a part of the line where each driver might have had a possible view of the other's engine for about 1,000 yards. From the point of collision towards Garngaber the line falls at 1 in 544 for 400 yards, then rises at 1 in 231 for 100 yards, and then on gradients of 1 in 62 and 1 in 78 for the rest of the distance. From the same point towards Avenue Head it rises at 1 in 544 for 370 yards, and at 1 in 432 for 265 yards, &c.

The collision occurred at about 5.30 on a morning stated not to have been particularly dark.

Evidence.

1. *Robert Stewart*, signalman five years, all the time at Avenue Head.—I came on duty at 4.56 a.m.; sooner than usual, on account of an arrangement with my mate who had a sick house. I at once signalled on Baird's train, which was approaching, to Garngaber, and Garngaber took it on at 4.56 a.m., and the train passed into the section. This train was cleared by Garngaber at 5.8, about the regular time. I then at once signalled on a special train from Summerlee to Garscube which had arrived at 5.4; Garngaber at first refused it; but at 5.14 a.m. Garngaber gave one beat on the bell, signifying "ready;" upon this I repeated four beats on the bell, Garngaber returned four beats and pinned the needle over to "down train on line" with the fifth beat, after which the special train immediately started. I was in the cabin between 5.8 and 5.14, and my mate was with me. At 5.25 Garngaber rang and cleared the special train, and immediately gave on an up train, and I at once acknowledged the signal and took the up train on line. The train was long in coming, and it was about 7 o'clock when I heard from the guard of the up train that there had been an accident. No train waiting signal (nine beats) had been given between 4.56 and 5.25 on this morning. When Garngaber has first refused a down train and then offered an up train, the practice is to accept the up train from Garngaber, and to keep the down train waiting at Avenue Head; but nothing of this kind occurred on the morning of this accident. The signals at Avenue Head are kept at "danger" unless a train is known to be approaching. My mate lowered the home-signal for the train from Summerlee and put it back to "danger." The next time the signals were touched was when I lowered both home and distant signals for the up train about three minutes after it had been given on from Garngaber, and I kept them so till I heard that there had been an accident. It often happens that Garngaber will refuse a train at first, and afterwards accept it.

2. *John McGillivray*, signalman about four years, about 1½ years at Avenue Head.—Stewart relieved me by arrangement at about 4.56 on the morning of the 25th January. I left the cabin at 5.14 to go home. I signalled the down train to Garngaber at 4.56 and lowered the signals for it. I saw this train cleared at 5.8, and made the entry in the book. A special train had meantime arrived at 5.4, and this was offered to Garngaber at 5.8, and refused by Garngaber till 5.14, when Garngaber gave one bell, and the train was then accepted and went forward at 5.16, I having lowered the home-signal as I left the cabin and returned it again to "danger." It is a common occurrence for Garngaber to refuse a train and then accept it, because the rising gradient near Garngaber makes it inexpedient to allow a train to

start from Avenue Head unless it can run clear into Garngaber.

3. *David Harkness*, signalman 10 years, 5½ years at Garngaber.—I came on duty at 6 p.m. for a 12 hours shift. At 4.50 (at which time yardsman John Wilson was in the cabin) the Gartshore train was signalled on to me from Avenue Head. I accepted the train and pinned the needle at 4.50; the train arrived at 5.0, and I cleared it back at once. About three minutes afterwards, at 5.3, Avenue Head offered another train, and I refused it, because I had no available room, and had a train standing on the main line, which I wanted to clear to allow the newspaper train to pass. At 5.5 I signalled an up train, viz., the 2.45 train from Garngaber, which was working in a siding, to Avenue Head; Avenue Head at once received it, and it started at 5.10. No signals passed after this between me and Avenue Head, but some time after the driver of the 2.45 train returned and asked me if I had taken or put on a train, and I replied that I had put one on. The yardsman had left the cabin at 5 o'clock, and no one was in the cabin with me when I gave on the Garngaber train to Avenue Head. The down needle was then showing "down line clear." I had at this time on line between me and Lenzie junction an up main line goods train; and the down line between me and Lenzie junction was also blocked with the Gartshore down train. I had also got the signal from Gartshore to enable me to send forward an up train standing on the down line. I was busy at the time and did not therefore enter the train I refused from Avenue Head until after I had entered two others. The erasure of the entry relating to the Gartshore train was owing to my having first entered it in the wrong place, viz., before instead of after the Bowling train. I had marked the refusal entry before I knew of the collision. As the yardsman left the cabin he said, I should do better to send the train to Avenue Head, before taking one from there; this I accordingly did.

4. *Samuel English*, driver eight years.—I was in charge of the 2.45 a.m. up mineral train from Garngaber to Kipps. We were 2½ hours late in leaving, at about 5.15 a.m., having been detained during the night. I had on a train of 32 empty, eight mineral waggons, and a guard's van. We got the signal to leave, and were running at a speed of about 18 miles an hour, at the bottom of the incline, when I saw three white lights ahead. At the moment I did not realize that it was another train, but I shut off steam; and on the lights appearing to move quickly I saw what it was, and reversed, but did not put on steam, and jumped off on the right side, about five waggons' length before the collision, the speed being a little reduced. The fireman, who had had no time to put his break on, jumped off on the left side. I fell

down, but escaped without injury, as did also the fireman. The time of collision was about 5.19. I had no time to whistle. I went back to Garngaber and was the first back there at about 5.45. I spoke to the signalman and told him there had been a collision. I asked him whether he had put a train on or taken one on, and he said he had put one on, and he asked me to look at the instrument, which I saw showed "up train on line." He did not appear at all confused. I did not look at his book.

5. *Donald McLean*.—I was second guard of the 2.45 a.m. up train. The collision took me quite unawares. After trying to liberate the fireman of the down train, I went forward to Avenue Head and reached it about 1½ hours after the collision. I noticed that the up home-signal was standing at "clear." The signalman was not aware that there had been a collision, and said he had been waiting above an hour for my train. The morning was rather dark; it was possible to see half a train's length.

6. *Donald McLeod*, driver 2½ years.—I started from Summerlee with a special down train for Garscube. We were due to leave at 3.45, and left at 4.5, and we reached Avenue Head at 5.0, with a load of 24 empty, six loaded waggons, and a van. We were stopped at Avenue Head for 15 minutes, waiting for signals, and then started. I was running at a speed of about 25 miles an hour, when I saw a green light, which I at first thought was being shown by a surface man, and shut off steam, and it was not till we were within 60 or 70 yards of the other engine that I saw what it really was. I then just had time to reverse, but not to put on steam, and jumped off. I tumbled down and some coals fell on me. I was injured in the head and shoulder. I was on the sick list for eight weeks. The fireman jumped off just before

me, by my instructions. He had not had time to put on his break. His thigh was broken. My head-light was a green one; the head-light for all goods engines, whether on single or double lines.

The collision took the guard unawares. He was slightly injured.

7. *John Wilson*, yardsman at Garngaber five years.—I left the signal cabin at about 5 o'clock, before the arrival of the Gartshore train, and I was not in the cabin again till after the collision. I did not hear Harkness refuse to take on the special train from Summerlee. After the Gartshore train had arrived, I called out to Harkness, not to take on another down train till he had sent on the Garngaber train to Avenue Head, knowing that otherwise the station would be blocked. When the Garngaber train was nearly ready I told him so, and he said he was ready for us. About 6 o'clock I saw the needle right for the up train. I did not look at Harkness's book. I did not hear the noise of the collision, but I heard some whistling, which soon ceased.

8. *William Burnett*, inspector.—I reached Garngaber about 11 a.m., and asked Harkness some questions about the erasure in his book. He said he had made a mistake by entering a main line train instead of a branch train, and I saw the entry "train refused at 5.3 a.m." I then went to Avenue Head and found the clock there seven minutes faster than at Garngaber, and an entry at Avenue Head "train refused at 5.8." On returning to Garngaber I asked Harkness whether he knew of the collision when he made the refusal entry at 5.3. He at first said "No;" but afterwards admitted to Inspectors Linfield and Hogg that he did know of it.

This was confirmed by Inspector Hogg.

Conclusion.

This collision on a single line between two mineral trains,—a collision accompanied by serious personal injury, and by great destruction to rolling stock—was caused by a mistake having been made by one or other of the two signalmen at Garngaber and Avenue Head, one of whom must have allowed a train to enter the single line before the previous train had been signalled clear. Allowing for the difference in the clocks at the two cabins, the Avenue Head signalman's register gives the following times:—

Gartshore down train	accepted by Garngaber at 4.49,	cleared at 5.1,
Summerlee	refused " "	5.1,
"	accepted " "	5.7, cleared at 5.18,
2.45 a.m. up train	" " Avenue Head	5.18,

the collision occurring at about 5.18.

The Garngaber register gives the following times:—

Gartshore down train	accepted by Garngaber at 4.50,	cleared at 5.0,
Summerlee	offered " Avenue Head at 5.3,	refused,
2.45 a.m. up train	accepted " "	" 5.5;

the Garngaber register shows no entry of the Summerlee train having been accepted and cleared; there is, moreover, an erasure in the entry of the train previous to that which was accepted at 4.50, and the entry of the refused signal is placed two lines below its proper place, and is to all appearance an after-thought, especially when taken in conjunction with the fact of the Garngaber signalman having first denied and then admitted to the inspectors that he had known of the collision before making the entry of the refused signal.

As the entries in the Avenue Head book are perfectly regular, and as the signalman there was apparently acting in the full belief that an up train for which he had taken off his signals was approaching after the down train had been cleared by Garngaber, I can only come to the conclusion that the Garngaber signalman had despatched the up train without looking at his block instrument; and that on hearing the collision take place, he had endeavoured to screen himself by first clearing the down train, and then by giving on the up train *after* the collision had occurred, and by making his register entries to correspond.

The Garngaber signalman is therefore greatly to blame, both for his omission to carry out the rules for working the single line, and for his endeavour to screen himself and throw blame on another man, by his subsequent conduct.

The driver of neither train can have been keeping a good look-out, for, although the engines must have come within sight of each other at a distance of about 1,000 yards, the collision appears to have taken each driver very nearly unawares.

This collision only shows how little dependence can be placed on the telegraph only for insuring safe working on single lines; and I trust that the directors of the North British Railway may be induced to order the use of the train staff, in addition to the telegraph, on this and the other single lines of their system where it is not yet employed.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major General, R.E.

Printed copies of the above Report were sent to the Company.

NORTH BRITISH RAILWAY.

Railway Department, Board of Trade,
13, Downing Street, London, S.W., April 8, 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 6th ultimo, the result of my inquiry into the causes of a collision which occurred on the 3rd ultimo, at Riccarton junction, on the North British Railway.

In this case, as the 6.20 p.m. up passenger train from Hawick to Carlisle, consisting of tank engine, two horse-boxes, third-class carriage, two composites, third-class carriage, and break-van, was running up to the platform at Riccarton junction, at 6.54 p.m., it came into collision, about 70 yards outside the up home-signal, with the tail of the 2.30 p.m. up goods train from Portobello, the engine of which was standing at the water column taking in water.

Seven passengers and one servant of the Company are returned as having been injured.

None of the vehicles in the passenger train were thrown off the rails or damaged in any way.

In the goods train three of the waggons were thrown off the rails, and the break-van and four waggons were slightly damaged.

Description.

At Riccarton junction, $65\frac{3}{4}$ miles south of Edinburgh, the Border Counties section of the North British Railway, a single line, leaves the North British double line from Edinburgh to Carlisle, the old Border Union line.

The station, which is to the north of the junction, has an island platform about 200 yards in length. At each side of this platform are carriage sidings, which are placed between the running lines and the platform, the connections being about half-way from either end of it.

Both up and down trains therefore run for about 100 yards outside these carriage sidings before arriving at the point where they come up to the side of the platform.

There are also sidings outside the line on both sides.

The whole of the signals are worked from the junction signal cabin, situated about 150 yards south of the south end of the platform.

The only signals to which it is necessary to refer are the up home-signal, situated about 10 yards from the north end of the platform, the high crossing signal, at some siding connections 146 yards outside the home-signal, used only as an indicator during shunting operations, and the up distant-signal, situated 730 yards outside the home-signal. This last signal can be seen for about 256 yards from an approaching train, and immediately after passing it the up home-signal becomes visible, and continues visible for nearly the whole distance up to the station.

The line through the station is on a 30-chain curve to the right, and on a gradient of 1 in 75, falling from a point beyond the distant-signal. The point of collision is 70 yards outside the home-signal, and the tail lights of a train standing at this point should be seen from an approaching train for at least 300 yards.

The line is worked on the block telegraph system, with a code of regulations, of which Nos. 10 and 11 are as follows :—

“No. 10.—No obstruction must, under any circumstances, be allowed on a block telegraph section if the needle applicable to that section (up or down, as the case may be,) indicates the approach of a train or engine.

“*Note.*—Junctions are excepted from the operation of this rule. Drivers of all trains and engines approaching any junction, worked under the block telegraph regulations, must be prepared to find the line at the junction occupied, and have their trains under such control as to be able to comply with Rule 70, page 37, which is as follows :—

“*‘Enginemmen approaching junctions must have their trains under such command that they can stop before reaching the distant-signal, whatever may be the signal exhibited; and when approaching the home-signal, they must be careful to stop at such a distance as may be sufficient to allow another engine to cross the line before them in safety.’*

“No. 11.—Trains are not to be considered ‘out,’ and the signal ‘line clear’ is not to be given, until the train or engine has actually left the station on its journey, except where special instructions to the contrary have been issued.”

There is no interlocking between the signals and the points, most of which are worked from the ground.

Evidence.

William Sketheway, signalman 11 months, four months at Riccarton, states: On the 3rd inst. I came on duty at 7 a.m. for a 12 hours’ shift, at the Riccarton junction signal-box. At 6.30 p.m. the 2.30 p.m. goods train from Portobello arrived, and I shunted it on to the up Counties line out of the way of the 4.25 up fast passenger train, which does not stop at Riccarton. The preceding block-telegraph station is Whitrope. At 6.31 I received from Whitrope the “train on line” for the 4.25 passenger train. I had given “line clear” at 6.31 p.m. At 6.36 I got the passing bell signal from Whitrope, signifying that this train had entered the section. It arrived and passed at 6.39. I then gave “line clear” at 6.39. I then allowed the goods train to come back on to the main line, in order to do the necessary work to make up its load to get away in front of the slow passenger train, as it is timed to do. It made two shunts into the siding on the up side of the line, and then went to take water. My up signals were kept at danger. At 6.42 I got “train on line” for the 6.20 p.m. up passenger train from Hawick, signifying that the train had passed Shank End. I have no record of the time this train passed Whitrope, but it must have been at about 6.50. At 6.54 it arrived, and ran into the tail of the goods train, which was standing at the platform taking in water. I can’t say exactly where the tail of the train was standing, as I cannot see it from the box. The fast passenger was seven minutes late. The goods train ought to have left at 6.35 p.m. The slow passenger train was due at 6.52, and was therefore two minutes late. My up distant and up home-signals were at danger. The high crossing signal was off. That is its normal position, and it is put on by me only when giving permission for the crossing to be used. The points at the crossing are worked by a yardsman. Before I give permission for them to be used, I get a signal from the yardsman, which works a lever and bell in my cabin. The signal is not intended to apply to the main line at all, but merely as an indicator; but it shows a light to trains on the up line. I have been in the service altogether three years. I saw the 6.20 train passing the distant-signal, and I thought it was coming faster than it ought to have come. The “train on line” signal corresponds with the “be ready” signal on some lines, and the passing bell signal with the “train on line” on those lines.

William McAdam, line inspector in the traffic department, states: It is my duty to travel over the

Hawick to Carlisle section, to see that the signals are properly worked. On the 3rd inst., I got into the 6.20 p.m. up train from Hawick at Stobs. I was riding in the guard’s van at the rear of the train. When approaching the distant-signal we were running from 20 to 25 miles an hour, and I said to the guard, “Why, that signal is at danger.” He was standing at his break, and immediately applied it as tight as he could. The speed of the train didn’t seem to diminish at all, and I don’t think the driver can have put on his break at this point. I was looking out of the left-hand side of the train, so did not see the home-signal, or the high crossing signal. We continued to approach the station at about the usual speed, and the first I knew of anything being wrong was from being thrown against the end of the van. I was slightly hurt. We must have been running 10 to 15 miles an hour at the time; but as it was a light train, I think the driver would have been able to stop at the proper part of the platform. I got out and found we had run into the tail of a goods train. The engine of this train was at the water column on the up line, and the tail was 40 or 50 yards north of the north end of the platform. None of the vehicles in the passenger train were off the rails, or damaged in any way. We did all we could to stop the train. There were no means of communicating with the driver. I spoke to the driver after the accident. He told me he had seen the distant-signal at danger. I said, “Why have you made a mess like this.” He pointed to the crossing-signal and said, “That one is clear.” I said, “That has nothing to do with it.” And he replied, “That is what deceived me.” I have never seen the tail light of the Carlisle train put on till after the 6.20 p.m. train has arrived.

Percival Hall, passenger guard 21 years, states: On the 3rd inst. I was guard of the 6.20 p.m. up passenger train from Hawick, consisting of tank-engine, two horse boxes, third-class carriage, two composites, third-class carriage, and break-van, in which I was riding. Inspector McAdam was with me; no one else. We left Shank End at 6.38, right time, and found the signals at Whitrope all right. On approaching the up distant-signal at Riccarton we were running 15 or 16 miles an hour, and I saw it was at danger. My break was just rubbing at the time, and I put it on tight at once. It skidded the wheels. It didn’t check the train much. We came past the distant-signal faster than usual when it is at danger, as fast as if it had been off. I looked out and saw that the home-signal was at danger. I went back to the break, but couldn’t get it any tighter.

I know that the sight of the home-signal is lost for a short distance. It was still on when we came in sight of it again. The train had reduced to about 10 or 12 miles an hour when we struck the tail of a goods train, about 70 yards outside the home-signal. I was slightly hurt, but I got out and found none of the vehicles of my train were off the rails. Three or four passengers complained of injury. We were delayed here about 40 minutes. There was no break on the train but the engine-break and my hand-break.

William McKay, goods guard three years, states: On the 3rd instant I was guard of the 2.30 p.m. up goods train from Portobello. We arrived at Riccarton at 6.30 p.m., and were immediately drawn forward on to the Border Counties up line to let the fast up passenger train pass. I was timed to follow this train in front of the slow passenger train, as we have to stop before Carlisle. As soon as the fast passenger train had passed, we were hand-signalled back on to the up main line, and the engine and two waggons were detached, made two shunts, picked up 11 waggons, and moved on again. The train then consisted of engine and tender, 40 waggons, all loaded but two, and the van in rear of the train. As soon as the engine was attached, the driver set back a little to get opposite to the water column to take in water. I went to my van and got in. We had been standing about a minute when I got up from my seat, and looking out, saw the lights of the train approaching, about 10 yards off. I jumped out, and the collision happened at once. Four waggons and my van were slightly damaged. The van was not off the rails, but two or three of the trucks had mounted and got off the rails, when the train was being pulled up. I don't think the passenger train was running above five or six miles an hour at the time. My engine was driven forward a little, but I can't say how far. I had three red tail lights on. They were all showing well. It was a clear night.

James Davidson, goods driver 3½ years, states: I am sometimes employed as a relief passenger driver, and on the 3rd instant I was driver of the 6.20 p.m. up passenger train from Hawick. The signals at Whitrope were all right for me, and I passed it at the usual speed. We had left Stobs right time. It was a fine clear night. On approaching the up distant-signal at Riccarton, I saw it was at danger. I was running about 10 miles an hour, or scarcely so much. I whistled for the signal, and told my mate to apply the break. He did so, and I reduced to about six

miles an hour. I didn't whistle for the guard's break. My steam was off. On passing the distant-signal, I looked and saw that the home-signal also was at danger, and I was proceeding to stop my train, when I saw three red lights ahead, which I thought were on the sidings. I didn't think they were on the line upon which I was running, and I had my train under such control that I could have stopped it easily at the home-signal. We struck the tail of the goods train about 70 yards outside the home-signal, running at about six miles an hour at the time. The home-signal is visible all down the bank, and I don't think it was ever taken off. I know the road very well, and I knew quite well what the crossing-signal meant. I didn't mistake it for the home-signal. My engine is a six-wheel coupled tank engine, with 4' 6" wheels, and with a hand break working one block on each wheel. I never whistled for the guard's break. I was within 20 yards of the goods van when my fireman called out to me. Until that time I had thought the lights were those of the Carlisle carriages standing on the siding. I was on the left side of my engine, that is, on the outside of the curve. I have always seen the lights of the Carlisle portion of the train lighted when I approached Riccarton. I have driven this train about once in 10 days for three years.

Richard Crone, fireman two years, states: On the 3rd instant I was fireman to James Davidson. We were running about 16 miles an hour when we first saw the Riccarton up distant-signal at danger. I put on my break, and reduced to about eight or nine miles an hour on passing the signal. I eased my break a little. The home-signal was at danger. I didn't see it till half way between the distant-signal and the crossing-signal. I slacked off my break a little to draw up to the home, as soon as I saw the crossing-signal all clear. I thought the distant had been at danger because the crossing-signal had been at danger. I saw the tail lamps of the goods train about half way between the distant-signal and the crossing-signal. I thought they were for the Carlisle train, and we were nearly on them before I found out my mistake. I immediately went to my break and stuck to it.

Lancelot Philipson, station-master at Riccarton, states: It is not usual for the tail lamps of the Carlisle portion of the 6.20 p.m. train, which is attached at Riccarton, to be lighted before the train arrives from Hawick. It is never done to my knowledge.

Conclusion.

From the foregoing evidence it appears that the 2.30 p.m. up goods train, which arrived at Riccarton at 6.30 p.m., was shunted on to the Border Counties line, out of the way of the 4.25 p.m. up fast train, and that, when this train had passed at 6.39 p.m., it was brought back on to the main line to take on some waggons, and to prepare to go forward to Carlisle in front of the next passenger train, the 6.20 p.m. up slow passenger train from Hawick.

The 4.25 p.m. fast train being seven minutes late, and the goods train having also been late had caused some delay, and this latter train, which ought to have left Riccarton at 6.35 p.m., was only taking in water, preparatory to a start, at 6.54 p.m., two minutes after the 6.20 passenger train was due. This train is timed to leave Riccarton for Hexham and Newcastle at 7 p.m.; the Carlisle portion, which is made up at Riccarton, leaving two minutes later. On the evening of the accident it had left Hawick at right time, and on arriving at Riccarton it came into collision, while running at about 10 miles an hour, with the tail of the goods train, which was on the up main line about 70 yards outside the up home-signal.

Both the distant and home-signals were at danger, and the accident was clearly due to the fault of the driver of the passenger train, in not getting his train under proper control on finding the distant-signal against him, in accordance with the rules of the Company.

He admits that he saw these signals at danger, but states that he could have

stopped his train short of the home-signal, which is, however, very improbable, although no doubt he could have stopped it at the proper place at the platform. He at first excused himself by saying that he was deceived by the high crossing signal being off, but at my inquiry he acknowledged that he knew that the signal did not apply to the main line, and stated that, although he saw the tail lamps of the goods train a long distance off, he thought they were the lamps on the Carlisle carriages, and that therefore they were on a siding, and not on the main line. It is, however, shown by the evidence that it is not the practice to put the tail lamps on the Carlisle carriages until after the arrival of the 6.20 train, and the statement of the driver was no doubt an after thought, to excuse himself for his culpable disregard of the rules of the Company.

Although this accident was due solely to the fault of one of the servants of the Company, yet it is incumbent upon me to call attention to the state of this station, which has not been in any way improved since it was opened in 1862, and which is very far from fulfilling the present requirements.

I am informed that this is the first time that any accident has occurred here, and if this be so it speaks well for the care and attention of those responsible for the working of the traffic at this station, for the arrangement of both the lines and the signals are faulty and incomplete, inasmuch as the points and signals are not interlocked, the points are not worked from the signal cabin, the signals in some instances are wrongly placed, not covering the fouling points, there are not safety points on all the goods sidings, and there are some most objectionable crossings.

When it is remembered that this state of things exists at a junction station on an incline of 1 in 75, upon a line conveying fast through passenger traffic by one of the main routes between London and Edinburgh, it is to be hoped that the North British Railway Company will see the necessity for a complete rearrangement of this station, short of which nothing can be considered as being satisfactory.

I have, &c.,

*The Secretary,
(Railway Department),
Board of Trade.*

F. A. MARINDIN,
Major R.E.

Printed copies of the above Report were sent to the Company.

NORTH LONDON RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, London, S.W., January 14th, 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 8th instant, the result of my inquiry into the causes of a collision which occurred on the 3rd instant at Shoreditch station, on the North London Railway.

In this case, as the 9.20 a.m. down passenger train from Broad Street to Poplar, consisting of tank engine, running coal bunker in front, front break-van, 10 passenger carriages, and rear break-van, was approaching Shoreditch station at about 9.38 a.m., during a dense fog, it came into collision with the tail of a train of 10 empty carriages, and two break-vans, the engine attached to which was standing at Shoreditch station down home-signal.

One passenger and the guard of the Poplar train are returned as being injured.

In the passenger train the tender of the engine was slightly damaged, and one carriage head-stock, some buffer castings and axle boxes were broken.

In the empty train the under-frame of the rear break-van was broken up, and the body much damaged. The under-frames of the three rear carriages were shifted. The passenger train was fitted with Clark and Webb's chain break in two sections, the front van and four carriages being connected with the engine, and the four rear carriages with the rear break-van, the two centre carriages being free. The engine, a 4-wheel coupled bogie engine, was also fitted with steam break with cast-iron break blocks, one to each coupled wheel.

Description.

Shoreditch station is the first station on the North London Railway after leaving Broad Street, and the Shoreditch station signal-box, at the north or down end of the

station, is about 1,180 yards from the down starting-signal at Broad Street. There are two intermediate signal-cabins, viz., Skinner Street and New Inn Yard, distant respectively from Broad Street 300 yards and 555 yards.

The down home-signal at Shoreditch is 159 yards, and the down distant-signal which is a slot on the New Inn Yard down home-signal, is 681 yards from Shoreditch signal-cabin. The point of collision was 104 yards outside Shoreditch down home-signal.

The line is worked on the absolute block system, and between New Inn Yard and Shoreditch is straight and level.

Evidence.

Edward Harvey states: I have been in the Company's service 14½ years, and 12 months a driver. On the 3rd instant I left Broad Street with empty train about 9.20 a.m., and found signals "off" at Skinner Street and also at New Inn Yard. On approaching Shoreditch I saw a flagman with a red flag, and whistled for the signal, drew up to it and found it "on." The fog was so thick that I could only see the signal about an engine's length from it. I stood about four minutes, and whistled again for the signal, but it was not taken off. Shortly after the collision occurred. I was not hurt. We were driven about 30 or 40 yards past the main signal. We went over two fog signals when drawing up to Shoreditch main signal. I was standing right at the signal post. I could not see the signal-box on account of the fog. The train consisted of eight carriages and two break-vans.

Samuel Shed states: I have been in the service 3½ years, and a fireman 16 months. I was fireman of the empty train. We found signals "off" at Skinner Street, and slackened for the signal at New Inn Yard which we whistled off. We found Shoreditch signal against us. A fogman gave us a signal to stop; and we pulled up steadily to the signal, and whistled for it to be taken off. I think we stood there about five minutes, when the collision occurred. I was not hurt. We were driven about three carriage lengths.

Benjamin Hodson states: I have been in the service 28 years as guard. On the 3rd instant I was in charge of the empty train which left Broad Street at 9.28 a.m. by my watch. It was so foggy that I could only see about two carriage lengths. Skinner Street signal was "off" for us. On approaching New Inn Yard I could not see the signal, but we slackened, and then went on to Shoreditch. I did not see a fogman at Shoreditch. I was riding in the rear break. We had stopped about three minutes at Shoreditch, and I had just lit my side lamps, when I heard some one shout and also something coming, so I jumped out of my break and the collision occurred. We were driven about a train's length. My van was smashed. The tail lamp was lighted but it was not visible for above 10 or 15 yards.

Christopher Patterson states: I have been in the service as driver 16 years. On the 3rd instant I took out the 9.20 a.m. Poplar train. There was a very dense fog at the time. The signal at Skinner Street was "off." I could not see the signal at New Inn Yard when approaching, but drew steadily up to it, and heard the fogman shout out "All right, go on," and then I saw the signal lowered. I then went on steadily towards Shoreditch, and saw what I thought was the shadow of a train about 12 or 14 yards ahead. I told my mate to hold on, reversed the engine, and applied my steam break, but immediately came into collision with the empty train. We were going about 12 miles an hour. I was not hurt. The empty train was driven 53 yards; I stepped the distance. My engine was slightly damaged. We ran about 60 feet after the collision. Immediately after the collision the fogman fogging for the Shoreditch main signal came from towards Shoreditch and asked if I was hurt. I saw no fogman between

New Inn Yard and Shoreditch. We were about eight minutes late in starting. I had no time to apply my patent break to the front section of the train. I whistled for the guard's break immediately I had reversed, and had applied my steam break, but there was no time to do anything. My engine is a tank engine with trailing and driving wheels coupled, and a front bogie. We were running coal bunker first. There is a cast-iron break block on each coupled wheel, which can be applied either by hand or by steam.

Joseph Hubble states: I have been in the service nine years, firing six years. I was fireman of the 9.20 a.m. Blackwall train. The driver's statement is correct.

William Herbert states: I have been in the service 13 years, and as guard nine years. I was in charge of the Poplar train and riding in the rear van. We left Broad Street at 9.32 a.m. by my watch. The fog was very thick at the time, and I did not see the signal at Skinner Street, but applied my break when approaching New Inn Yard, and released it when the driver whistled it off. We did not come quite to a stand at New Inn Yard. We went on in the direction of Shoreditch. I did not see any train ahead, and could not see more than three coach lengths from my break. We came into collision with a train and I was thrown on the floor of the carriage. I saw no fogman between New Inn Yard and Shoreditch. The train consisted of tank engine, front van, 10 carriages, and rear van. Four carriages and front break-van were coupled with chain breaks to the engine, and the four rear carriages to my van. The two centre carriages were free. I did not hear any whistle for my break on approaching Shoreditch. I was knocked down and too much hurt to take any steps after the accident. I do not know if any passengers were hurt.

Jesse Gratwick states: I have been in the service six years, and two years as guard. I was under-guard of the Poplar train, and was riding in the front break-van. The Skinner Street signal was "off." We drew up steadily towards New Inn Yard, and I felt my mate apply his break. Just before the train came to a stand I saw the signal drop, and the fogman called out "right away." We then went on towards Shoreditch, and came into collision with the other train. I did not see the train in front of us. The fog was so thick. I was standing up in the break looking out of the window at the time, and was thrown down. We were going about 10 or 12 miles an hour. No passenger complained to me of being hurt. I do not recollect hearing any whistle for the breaks. I had a hand-break in my van. I went back to protect the train.

Eli Bursey states: I have been in the service as signalman 13 years, and have been in New Inn Yard box since it was opened, about two years ago. I gave on to Shoreditch the train which passed in front of the empty train, and received "line clear" for it from Shoreditch. I also gave on the empty train, and got clear for that one from Shoreditch. The empty train

did not have to stop at my signal, as I dropped it just as the train arrived at my box. As soon as I got clear from Shoreditch for the empty train I gave on the Poplar train and dropped my signal. I think the Poplar train was slackened by my signal. There was an interval of about three minutes between the passing of the empty train and the Poplar train, and over five minutes between the train in front of the empty train, and the empty train itself. I am positive no train was allowed to go on to Shoreditch without my having previously got "line clear" for the preceding train. We do not book the time of trains passing. There was a fogman at my down home-signal. My distant is a slot on Skinner Street down home-signal. This was off. The train before the empty train was a Barnet train. I gave that on, and it was accepted, and as soon as I got "line clear," I gave on the empty train at once and got it accepted. I got "line clear" for it, and at once gave on the Poplar train, and it was accepted.

Patrick Sculliver states: I have been in the service about 15 months, and in Shoreditch box one month. The train which preceded the empty train was not given on to me by telegraph from New Inn Yard, and I blocked the road, and threw up my slot to New Inn Yard as soon as I saw the train in the station. At that time New Inn Yard was trying to give me another train on, which I did not accept. As soon as the train in front of the empty train left the station I cleared back to New Inn Yard and took off the slot. Then I had another train given on from New Inn Yard. The next thing I heard was the station-master telling me to block all lines as a collision had occurred. I did not see the fogmen, but heard the fog signals going off. I could not see a train standing at my home-signal in consequence of the fog. I do not recollect whether my signals were off for the Barnet train or not. I blocked the road back when it arrived by giving six beats on the gong, and put on the slot which would keep the New Inn Yard down home-signal at danger. Before I did this New Inn Yard gave me two beats for another train. I would not answer it, but gave him the block instead. He did not repeat it. As soon as the Barnet train went on I gave "line clear" to New Inn Yard, and took off the slot. New Inn Yard then gave me two beats, and I answered it, giving one beat, and turning the needle from "line clear" to "train on line." I am certain I took my slot off for only one train after the Barnet train had gone on from Shoreditch.

Alfred Dilley states: I have been in the service as platelayer three years. I came on duty at the

Shoreditch main signal as fogman at 8 o'clock on the 3rd instant. I had run short of fog signals (I had begun with three dozen), and I asked the man fogging for No. 2 road to look after my road whilst I went and fetched a further supply. I put two fog signals on the line when I went away, and whilst the station-master was giving me some more I heard my two signals go off, being exploded by the empty train. I then ran back, and just as I got past the engine of the empty train the collision occurred. Alfred Seward, who undertook my fog duty while I was away, flagged in the empty train.

Alfred Seward states: I have been in the service as platelayer about eight months. I was fogging for No. 2 down road, when my mate asked me to fog for him whilst he went for some more fog signals. He put two down, and ran back. The empty train then came up and I flagged it up to Shoreditch main signal. It exploded the two signals my mate had put down. I was going back behind it when I heard a train coming down No. 2 road, and I ran to see how the signal was for it, and finding it "on" put down two fog signals for it. I was then going to the rear of the empty train, but before I could get there the collision occurred. I "holloed" to the driver, but had no time to put down any signals. The empty train stood at the Shoreditch home-signal about three minutes. Dilley was not away above a few minutes. He ran to the station as soon as the Barnet train had passed and he had put down two fog signals.

William Goldsmith states: I have been a platelayer for 30 years, and three years in the service of the Company. I came on duty at 7 a.m. on the 3rd instant I was posted at the down home-signal at New Inn Yard. I cannot remember what trains they were which passed exactly, but I am perfectly certain that no train whatever passed the signal until it was dropped. I remember the Poplar train passing, and when it was approaching the signal was at danger. Before it came to me the arm dropped, and I took my fog-signals off, and held up my hand to the driver saying "all right." He had not quite stopped but had nearly done so. The train preceding the Poplar train ran over one fog signal, but I am certain the arm was dropped before it went on, and if it ran over the fog signal it is because I had not time to pick them up.

The station-master at Shoreditch states that Dilley, the fogman, lost no time when getting a fresh supply of fog signals, and hurried back to his post.

Conclusion.

From the foregoing evidence it appears that on the morning of the 3rd instant there was a dense fog which prevented the signalman in the Shoreditch station signal-cabin from seeing a train when standing at his down home-signal, and caused the signals to be invisible at a distance of a few yards only, to which state of the weather this accident must in the first instance be attributed.

It further appears that a train of empty carriages, which left Broad Street station at 9.20 a.m., was pulled up at Shoreditch down home-signal, until the station had been cleared of a down train for High Barnet, and that while it was so standing, the signal being at danger, it was run into from behind by the 9.20 a.m. down passenger train for Poplar, which had left Broad Street at 9.28 a.m., and was approaching Shoreditch station at about 12 miles an hour.

The signalman at New Inn Yard, the cabin next before Shoreditch, states positively that he gave on both these trains to Shoreditch, and that they were accepted in the proper manner, while the signalman at the latter cabin is equally positive that he received no signal for the empty train, that he did not give permission for it to approach, and that up to the time that the accident occurred, he took off his slot on the New Inn Yard down home-signal for one train only after he had done so for the High Barnet train.

This statement of the Shoreditch signalman is however contradicted by the evidence of the drivers of the empty train and of the Poplar train, and by that of the fogman at New Inn Yard down home-signal, to the effect that this signal was off for both these trains, which could not have been the case had not the slot been taken off from Shoreditch signal-cabin.

The accident was clearly due to a mistake between these two signalmen, and it is impossible to be certain which of them is in fault, but, under the above circumstances, I am of opinion that the one responsible is the signalman at Shoreditch, who probably forgot that he had accepted the empty train, and not seeing it standing at his down home-signal, permitted the Poplar train to approach.

It was unfortunate that just at this moment the fog signalman at this signal post, having used all his fog signals, was obliged to go away for a fresh supply, and that the man whom he left in temporary charge of his post, having another line to attend to, was delayed in going back to protect the empty train, for had it been otherwise the accident might probably have been averted.

The very frequent occurrence of accidents of this description, arising from mistakes between the signalmen in two adjacent boxes, points to the advantage which would accrue from the adoption of some means of stopping signalmen from giving "Line clear," before a train which they have accepted in block has passed out of the block section.

The system of interlocking the signals and the block telegraph instruments, which has been successfully tried on one or more lines of railway, effectually prevents a signalman from lowering his signal for a train to proceed, until he has received "line clear" from the signal-box in advance, and if this system were supplemented by some mechanism which would equally prevent the signalman in this advance box from giving "line clear," after a train had entered the block section, until his block telegraph instruments had been set at liberty by the actual passing of this train, then the necessary safeguard against accidents of this nature would be provided.

I have, &c.,

The Secretary,
(Railway Department,) Board of Trade.

F. A. MARINDIN,
Major R.E.

Printed copies of the above Report were sent to the Company on the 13th February.

RHYMNEY RAILWAY.

Railway Department, Board of Trade,
February 1st, 1879.

SIR,

IN compliance with the instructions contained in the order of the 28th ultimo, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances which attended the running away of a mineral train on the Rhymney Railway, and its subsequent collision with another mineral train at the south side of Cardiff station, which occurred on the 22nd ultimo.

The engine-driver and breaksman of the runaway train, and the breaksman of the train that was run into, were injured.

The engine and 13 waggons of the runaway train were damaged and thrown off the rails, and the van at the tail of the mineral train that was run into was also damaged and thrown off the rails. The permanent way was only slightly injured.

The Rhymney Railway is a line with severe inclines. It extends from Dowlais and Rhymney to Cardiff. Between these places it is a passenger line as well as a mineral line, but from Cardiff station to the Docks the line is used for mineral purposes only.

The train ran away after it passed the signal-cabin at the south end of Caerphilly tunnel. This cabin is about half-way between the tunnel and Llanishen station. The distance from this signal-cabin to Cardiff station is about four miles. The railway falls 1 in 130 from the north to the south end of the tunnel; it falls 1 in 80 from the south end of the tunnel to within half a mile of Cardiff station; and from thence to Cardiff station and to the Windsor Road bridge, which is half a mile south of Cardiff station, the line is level. The runaway train collided with another mineral train that was standing on the down line close to Windsor Road bridge.

The evidence is as follows:—

Thomas Baldwin, driver, states:—On the 22nd on my way down, and the last place I stopped at was instant I started from Vochriew and collected waggons at Aber junction. On leaving Aber junction my

train consisted of a tank-engine, running with its coal bunker in front, 38 or 39 loaded waggons, and a break-van at the rear of my train. The signalman at Aber junction lowered the signal for us to start, and the guard of my train gave me a white light with his hand-lamp to start from Aber. The breaksmen of my train travelled on the engine, and the guard was in the van on leaving Aber. We entered the tunnel at a speed of about six or seven miles an hour; the guard told me on leaving Aber to go easy, so that he could put down breaks. The north end of the tunnel is about $2\frac{1}{2}$ miles from Aber. I did not see the guard on entering the tunnel, and the breaksmen remained on the engine. I ran through the tunnel at about the same speed (about seven miles an hour) as we entered it, and came out of it at that speed. I had my break slightly on to keep the train steady coming through the tunnel. I did not see the guard coming out of the tunnel. The signals at the tunnel south box, which is about half a mile south of the tunnel, were at "all right," and after passing this signal-cabin I found my train was gaining speed, so I told the breaksmen to go back along the train and put some breaks down, and I opened the break-whistle to tell the guard to put down breaks. The train, however, continued to gain speed, and it ran past Llanishen at a speed of about 30 miles an hour. I had whistled several times for the guard to put down breaks, but the train was not checked at all, and continued to gain speed till I reached Cardiff signals. I was going about 40 miles an hour at this time; the Cardiff signals were against us, and I reversed my engine, keeping the breaks hard on. After passing Cardiff station I and my fireman were engaged sanding the rails, when the fireman saw the lamps at the tail of a train standing on the line in front of us. He jumped off and called to me to jump off also, but I did not hear him, and my engine ran into the van of the coal train that was standing on the main line near Windsor Road bridge. I kept my break-whistle on the whole time after sighting Cardiff signals at "danger." I think I was going at 20 to 25 miles an hour when my engine struck the van of the coal train. Several of the waggons on my train were knocked off the rails; I do not know how many. The weather-board of my engine was broken and fell on me and hurt me in the back, but I jumped off the engine after the collision. My engine was knocked off the rails; the bunker-end of the engine was tilted up. I have been 13 years in the Company's service, and about two years a driver. Our usual load is 50 to 60 waggons. I generally on entering the tunnel and leaving it get a hand-signal from the guard of my train, to signify that he is all right and has got sufficient breaks down. I did not get a signal from the guard on the present occasion, because he was in his van, and I had the breaksmen on the engine to put down such breaks as were required, and I felt the train as I thought coming all right. When I sent the breaksmen back to put breaks down I did not think we were going so fast. The breaksmen did go back on the train. I do not know what he did, whether he put down breaks or not. He never came back to the engine. I had often travelled with the breaksmen before. I believe it was about 11.25 p.m. when we passed Cardiff station. It is usual for me to signify by crow-whistle when I am in the tunnel, if I feel that the train has sufficient breaks on. I thought in going through the tunnel on the night in question that I had sufficient. I did not crow on the night in question; sometimes we do and sometimes we don't. It is usual to put down more breaks on coming out of the tunnel. There is a foot-path laid down to enable the guards and breaksmen to walk along the train to put them down. On the night in question none were put down there, as I did not think it necessary from the easy way the train was running. I know that I ought not to have come through the tunnel with my break on. My back is stiff, but I am getting better. I cannot recollect the guard of my train riding on the engine on leaving Aber. I remember his telling me at Aber to

go steady into the tunnel so that he could put the breaks down.

Edmund Hill, breaksmen, states:—I was breaksmen of the 10 p.m. coal train from Bargoed on the 22nd instant. The last place the train stopped was at Aber junction. I had ridden in the van at the tail of the train until we came to Aber. We left seven waggons of coal at Aber. I rode on the engine from Aber. It is a rule of the railway for me to do so from Aber to the south end of the tunnel. We entered the tunnel at such a speed that I could have put down breaks if required, but they were not put down. I saw my mate put down one break at the off-side of the train next the six-foot. We ran through the tunnel about the same speed, but the train from the middle of the tunnel to the south box gained speed somewhat. On coming out of the tunnel the driver said to me "Edmund, she is going nicely." I said "Yes." After passing the south box, he said "She is gaining speed, you had better go back and put some breaks on." I went back, put down the break of the first waggon, and then went on and put down several at the near or out side of the train; some of these breaks would not catch, others did not seem to bite, and some did. I remained about the 8th, 9th, or 10th waggon from the engine till I came in sight of the Cardiff signals, and then, as my waggon was rocking violently, I thought I should be better on the Bargoed small coal, so I moved back further, and I remained there until the collision occurred, when I was thrown off the waggon. I believe the waggon remained on the road, but the door was stove in. I was hurt a little bit in the leg. I think the 10 leading waggons belonged to the same owner, and that the break-handles were on the same side. I have been about six or seven months a breaksmen in the Company's service. I think there were about four of the breaks that would not catch. I could do no more than I did. The driver, I think, could have stopped at the south end of the tunnel.

David John, guard, states:—We left Vochriew about 6.10 p.m. I do not know what time we are timed to leave it. I have been two years and a half in the Company's service, and six weeks a guard. I have been acting guard about 12 months. We arrived at Aber at 10.40 p.m. We put off seven trucks of coal there, and left Aber at 10.50 p.m. When we left Aber the train consisted of 39 waggons of coal, with a break-van at the tail. I travelled on the engine on leaving Aber. I left the engine as the train entered the tunnel, and put down six breaks at the six-foot side of the train; they were the breaks on the Dowlais waggons, from the 13th from the engine to the 18th. I then kept on the 18th waggon, and rode on it through the tunnel. We were going about walking speed when we came out of the tunnel. I was still riding on the same waggon till the train passed the signal-cabin at the south end of the tunnel, when the driver gave two whistles for breaks. I then went back and put on about 12 more; some of them were good and some were not. I did not press them all down, because they dropped to the bottom when I took them out of the rack. I think six or seven that I pressed down held down. I thought the breaks were in good order when I brought them out of the colliery. I think some of them were burnt coming down the incline from the colliery, and the consequence was they would not act after leaving Aber. When the train came out of the tunnel we were going rather too fast to walk, but not so fast that if I had got off the train I could have got on again. I got into the van when I reached Crwys Bridge, close to Cardiff distant-signal. I put the break on the van as soon as I got into it. We were going pretty fast at this time. I stood at my break when the collision occurred, and I was not hurt. Thirteen of my waggons next the engine were damaged and thrown off the rails. The driver applied the break-whistle continually coming down the incline; he first applied it after passing Llanishen station. I

could not do any more than I did to stop the speed of the train. When coming out of the tunnel we were going too fast for me to put breaks on, although I think I could have got down and got up again. I could have put on breaks, but I did not think we were going sufficiently fast to require them. We do walk alongside trains at the south end of the tunnel to put breaks down, but not always. When bringing a train down the same morning, of 55 waggons, I did not get off at the south end of the tunnel, but rode on the waggons the whole way to Cardiff. When I put the six breaks down at the north end of the tunnel I was walking alongside the train; they were rack-breaks without pins; there are sometimes pins but not always. I had my lamp in my hand coming through the tunnel, and all the way down, and it was alight. When the train passed the cabin at the south side of the tunnel I had only put on the six breaks at the north end of the tunnel. I did not signal to the driver either going into the tunnel or going out to show that I was all right, it is not usual for me to do so. The driver did not give a crow on the night in question, it is not usual for him to do so. We were a couple of hours later than usual on the night in question. I came on duty at 8.30 a.m. on January 22nd. I left off duty at 8.30 p.m. the evening before. I went on duty at 3.30 a.m. on the 21st.

Evan Phillips, signalman, states:—I am stationed at the tunnel south signal-box. The Bargoed coal train passed my cabin about 11.16 p.m.; it was going about the usual rate. I lowered both our home and starting signals for the train to pass me, and I entered the time of its passing in my register. I saw someone on the engine. I cannot say how many. I did not see any one on the waggons of the train. I saw no one on the van. I saw no light on the waggons, but I saw two red lights on the van at the tail of the train. I saw one green head-light on the engine. I have been over two years a signalman, four months of which I have been at tunnel south box. I do not think a man could have passed on the train at my side without my seeing him.

Thomas Thomas, driver of an up train on January 22nd, states:—I passed the runaway train on the night of the 22nd instant on the Llanishen viaduct. I was driving an iron ore train in the opposite direction. I thought the train was going too fast and running away. I think I should have seen any one on the train had they had their hand-lamps, but I did not see any one. I did not notice any one at either end of the van at the break-wheel. I saw no fire or smoke coming from any of the breaks on the train. If the breaks had been down there would have been fire or smoke, considering the speed that the train was running.

William Lewis Langley, signalman at Cardiff station, states:—I recollect the night of the 22nd instant. The coal train ran past my box at 11.22

p.m.; it was going very fast indeed. My signals were against it. I had no means of preventing the runaway in any way. I did not notice any one on the engine, it was going so fast, neither did I see any one on the train. There was no one at the back of the van. I cannot say if there was any one at the front end of the van.

William Jenkins, waggon inspector, Cardiff, states:—I examined the breaks of the runaway train after the accident. The 13 waggons next the engine were damaged, so that I could not judge of the condition of the breaks; of the 26 others that I examined the breaks were all in good order. As far as I could judge from the state of the blocks, only five of these had been applied. None of them had been burnt; some of them were not even taken out of the racks. I have been 15 years waggon inspector under the Company. There was not one of the breaks on the 25 waggons in such a state that the levers would drop to the bottom of the racks when taken off the rest.

John Jones, traffic inspector, Cardiff, states:—I examined the waggons of the runaway train five minutes after the collision, and out of the 25 Dowlais waggons which remained on the rails I only found four of the break-levers that had been dropped on the wheels, and these were neither pressed down into the rack nor pinned down. The others were not taken off the rest.

John Jones, fireman to Baldwin, states:—On leaving Aber on the night of the 22nd instant the guard and breaksman both rode on the engine as far as the tunnel. The guard got off the engine to put on breaks at the north end of the tunnel. The breaksman continued on the engine till half way between the cabin at the south end of the tunnel and the Llanishen station. He then went back to put on breaks, because the train was running away. We first observed the train gaining on us just at the south end of the tunnel. The driver whistled for the breaks just before the breaksman left the engine. Just below Llanishen station he opened the large whistle, and continued to blow it all the way to Cardiff.

David Evans, breaksman of Bargoed coal train that was run into, states:—When we came to a stand at the south side of Cardiff station, on the 22nd instant, the train consisted of a tank engine, nine waggons of coal, and break-van, in which I was riding, at the tail of the train. The guard who had been with me had just gone out, and as I had nothing to do, and it was cold, I closed the door and took up my hand-lamp to prick up the wick. I heard the engine of the runaway train, but had no time to get out of my van before it struck it, and I was knocked down senseless. When I came to my senses I found myself under the van, caught by the legs with the timbers. I was cut in the eye. My mate released me. I was severely burnt in the hand, but I am recovering fast.

Conclusion.

It appears from the foregoing evidence, that on the evening in question a mineral train, which consisted of a tank-engine running with its coal bunker in front, 39 waggons loaded with coal, and a break-van at the tail of the train, left Aber junction about 10.50 p.m. There was a guard and a breaksman with the train, and in accordance with the Company's rules these men should put down some breaks on entering Caerphilly tunnel, which is a little more than two miles from Aber junction. The train should go quietly through the tunnel, and leave it at such a speed that the guard and breaksman can put down all the breaks that are required as the train leaves the tunnel. There is a path at the south end of the tunnel which was made on purpose to facilitate the operation of putting down breaks.

On the night in question both the guard and the breaksman rode on the engine as far as the north end of Caerphilly tunnel. The guard then left the engine, and he appears to have put down five break-levers, viz., those on the 14th, 15th, 16th, 17th,

and 18th waggons, but not to have pressed or pinned them down. The train appears to have run through the tunnel at a speed of about 6 or 7 miles an hour, having been held back by the break on the engine, and to have emerged from the tunnel at about the same speed. It passed the signal-cabin about half a mile south of the tunnel at a moderate speed. Immediately after passing the signal-cabin the driver thought that the train was going too fast, and that he was losing control over it; he thereupon sent the breaksman back along the waggons to put down breaks, and he whistled for the guard to apply breaks. The breaksman stated that he put down all the breaks on the six-foot side between the engine and the 13th waggon; that there were about 10, and that five of these were good breaks and five ineffective.

The guard stated that he put down all the breaks that he had not put down at the north end of the tunnel, and then got into his van and put on the van break. The train, however, continued to gain speed, ran through Llanishen station and on towards Cardiff gaining speed all the way, till it came to the foot of the incline, where it appears to have been running at the rate of at least 40 miles per hour.

The Cardiff signals were at "danger" against it, but it continued its course through the station, and struck a mineral train that was standing on the line about half a mile south of the station, at a speed that is estimated to have been about 20 to 25 miles an hour. The driver of the runaway train stated that after applying the break to his engine as much as he could, he reversed his engine and put steam against her, but this had no effect in stopping his train.

From the evidence of the traffic inspector and waggon examiner, it would appear that of the 25 breaks which the guard stated that he put down, only five of them appear to have been taken off their rest or dropped on to the wheels, and that these five did not appear to have been pressed down. With reference to the 13 leading waggons of the runaway train, they were so damaged that it could not be ascertained how far the breaks had been on or not; but according to the breaksman's own statement he only appears to have applied five of these in an effective manner. From the evidence of the waggon examiner and traffic inspector the whole of the breaks of the train were in good order, and would have been effective had they been properly applied, in which case the train would not have runaway.

The accident appears to have been caused by the engine-driver of the mineral train that left Aber at 10.50 p.m. proceeding from Caerphilly tunnel to Cardiff without having a sufficient number of breaks on the waggons of his train to enable him to control it while descending the incline. He ought to have known this by his being obliged to keep his engine-break on, while passing through the tunnel, and he should have stopped the train at the south end of the tunnel and required the guard and breaksman to apply a sufficient number of breaks.

There can be no doubt that a sufficient amount of break-power was not applied to the train on entering the Caerphilly tunnel, and that much more should have been applied on emerging from the tunnel. This is contemplated and required by the Company's rules, in order to secure the safety of trains descending a long incline of 1 in 80 to Cardiff.

Whether the guard was riding on a waggon about the centre of the train when it emerged from the Caerphilly tunnel, or whether he had gone and shut himself up in his van, could not satisfactorily be ascertained; but from the evidence of the signal-men at Cardiff and at the signal-cabin at the south end of Caerphilly tunnel, as well as from the state of the breaks, and the evidence of the driver of the up train who passed the runaway train on the Llanishen viaduct, I think the guard was travelling in his van, and was probably asleep. There is no doubt that he neglected to apply the breaks as he should have done. He seems to have been employed for very long hours, viz., from 3.30 a.m. to 11.30 p.m. on the day of the accident, and from 3.30 a.m. to 8.30 p.m. on the day previous, and no doubt he was fatigued, and probably unfit from fatigue to do his duty properly.

His train had been blocked up and delayed for two or three hours by signals while passing over the Brecon and Merthyr line. There is some difficulty and danger in working these long mineral trains over heavy inclines. The Railway Companies say that the accidents take place more frequently with the light trains than they do with the heavy trains; and in the present case the same men had brought a train of 55 loaded waggons safely down the same incline in the morning, whereas they allowed 39 waggons to runaway with the engine in the evening, when the rails were in an equally good state, and there is no doubt that these accidents frequently occur from the men taking liberties with the light trains that they take charge of,

believing that they can control them, but they find when it is too late that they are mistaken.

It is essential to safety in working these inclines, that a sufficient number of waggon breaks should be applied at starting, and steam applied to the engine, which ought to pull the train and keep the couplings in tension, so that the weight of the engine with its breaks may be in reserve to check any undue speed; and further, that there should be a fair amount of break-van power as a reserve, in addition to the breaks that are applied to the waggons.

Moreover, it is important that the engine-driver and guard should communicate with each other, and be mutually satisfied and agreed that all that is necessary has been done before starting down these long inclines. To insure this being done it is desirable that the trains shall come to a stand before starting down the inclines; and I recommend that all mineral trains shall be brought to a stand at the south end of Caerphilly tunnel, at the top of the incline of 1 in 80, so that the men can have no excuse for not applying sufficient breaks.

Engine-drivers while descending these inclines on dark nights cannot always judge accurately at what speed their trains are running. Whilst the speed is 10 miles an hour or less the trains can be easily controlled, but when the speed is 12 miles an hour or more it becomes often impossible to control heavy mineral trains. The margin of speed between safety and danger is very small, and it is therefore necessary that the break-power of the engine and a fair amount of break-van power should be available the moment it appears to be required.

The time necessarily lost by the guard and breaksman running along the waggons to put down the waggon breaks renders the application of these breaks ineffective if the speed gets beyond the driver's control, whether by accident or owing to momentary inattention on his part.

Moreover, putting down waggon breaks when mineral trains are running fast is a dangerous duty.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. H. RICH,
Colonel, R.E.

Printed copies of the above Report were sent to the Company on the 22nd February.

RHYMNEY RAILWAY.

Board of Trade (Railway Department),
13, Downing Street, London, S.W.,
1st February 1879.

SIR,

IN compliance with the instructions contained in the order of 28th January, I have the honour to report, for the information of the Board of Trade, the result of my inquiry into the circumstances connected with the collision between a London and North-Western goods train and a Rhymney Company's passenger train, which occurred on 24th January at Cardiff station of the Rhymney Railway.

No persons were injured.

The engine of the London and North-Western train, and the last coach and break-van of the passenger train, were damaged.

Cardiff station of the Rhymney Railway is protected with home and distant signals. The down distant-signal is more than half a mile north, and the down home-signal is opposite the cabin, which is situated at the north end of the down line platform. These are good signals, and are interlocked with the points.

There is a cross-over road between the up and down lines opposite the cabin.

The collision occurred between a goods train, which was running into Cardiff station on the down line, and the 6.30 a.m. up passenger train, which had been standing at the down line platform, and was just leaving the station by the cross-over road and passing on to the up road, at the time that it was run into by the goods train.

The passenger train consisted of an engine and tender, two passenger coaches, and a break-van, with the guard in charge at the rear of the train.

The goods train consisted of a tank engine, running with its funnel in front, 14 loaded waggons, 6 empties, and a break-van, with the guard in charge at the rear of the train. The goods train was running at a speed of about six or seven miles an hour, and the passenger train was just starting at the time of the collision.

The evidence is as follows:—

Evidence.

William Morgan.—I was the engine-driver of the 3.35 a.m. London and North-Western goods-train *ex* Abergavenny on 24th instant. The train consisted of tank-engine, funnel in front, 14 waggons goods, six empty waggons and break-van, with guard in charge. Left Rhymney at 5.20 a.m., and had a through run to Cardiff. On descending Llanishen Bank, I found the Cardiff down distant-signal showing a bright white light, and coming down between the distant and home signals found the home-signal showing a white light, but not so bright as the distant, but enough to satisfy myself that the road was clear. The guard had his break on, coming down the bank, and the fireman also had on his break, which reduced the speed of the train to about between 7 or 8 miles an hour. I then found the train would not run into the station, and put on a little steam, and was drawing up to the signal-cabin south of station, as we had to stop there for the purpose of taking numbers. On approaching the signal-box I saw the passenger-train crossing over from the down to the up line, and we came in contact with the break-van. Had the passenger engine driver opened his whistle, or the signalman given some kind of hand signal, I might have used a little exertion and prevented the collision. The engine of the Rhymney Company had a white head light, and I therefore thought the train was standing on the up line. About 20 minutes after the collision took place, I went back in company with guard Lloyd to ascertain the state of the signals, and found that the "home" signal was showing three parts white light, and the other part red. This appeared from the distant-signal, and all the way down to the "home" signal. The arm was at danger at this time. I went beyond the distant signal, and found it showing a red light. I am not sure whether I drew the attention of the Rhymney Company's servants to the state of the signals. I was not injured, and did not jump off my engine. The damage to my engine was as follows:—Buffer plank broken; framing, right-hand side knocked up, also dry sand-box broken; one cylinder cock knocked off; one crank pin, one side rod brass and cotter damaged; two tool boxes on the framing also damaged; and union under the tank also broken. Neither the engine or any of the waggons of my train were knocked off the line. I may say I came into the station with perfect confidence on account of the state of the signals; in fact I never came in with greater confidence. I have been in the service of the London and North-Western Company between 11 and 12 years, and have been a driver between five and six years. I did not see the passenger train till my engine was alongside of the passenger train engine. I was running about seven miles an hour. I reversed my engine; I put on steam, but could not stop. When driving a passenger train, I always change my lights when crossing from one road to another. We do not come to a stand at the station for the purpose of taking numbers. Could not see the engine light when it was on the down road, further than 130 yards, as it is obstructed by the signal-box. Was going about seven miles an hour when the collision occurred, at 6.35 a.m. I have been running into Cardiff for 19 months. I was before my time. My train is due at the docks at 7.40 a.m. I have arrived at Cardiff as early on previous occasions. I have arrived when passenger train was on the line, but the signals have been at danger, and I have stopped short. I have been to the signal-cabin, and cannot lower the down signals when the lever that works the cross-over road on which the passenger train was moving is out of the notch.

John Hill says: I was the fireman of 3.35 a.m. London and North-Western goods train "*ex*" Abergavenny on the 24th instant. When within sight of the

Cardiff down distant-signal, which is visible from the cemetery or thereabouts, which is half a mile or more north of signal, I saw it showed a white light; and this drew my attention, knowing that the passenger train would be about, and I was specially on the look out for signals. When I passed the distant-signal I noticed the "home" signal was showing a white light, but not so distinct as the distant-signal. I had not found it necessary to put on my engine break coming down the bank, as the guard was able to control the train with his break. On getting inside the distant-signal I found the train coming a little free, so I applied my break, which reduced the speed so much that I had to let it out again, which I did near the level-crossing which is about 400 yards from the Cardiff station, and after running about 100 yards the driver put on steam. I observed the home-signal showing a white light as long as I could see it. I then saw the Rhymney railway passenger engine upon the up road with a white head light; and we came in collision with the through carriage and break-van of the passenger train, causing the damage to our engine as described by my mate. The Rhymney Railway Company's driver, Forbes, who was standing with his engine and train on the machine road when we passed, remarked after the collision to me that he saw us slack our train, and wondered at our putting on steam, knowing the passenger train was about. I asked him if he noticed the signals, and he said he did not. Have been in the service of the London and North-Western Company seven years, and have been a fireman five years. Was not injured, nor did not jump off my engine.

William Lloyd says: I was the guard of the London and North-Western 3.35 a.m. goods train *ex* Abergavenny, 24th instant. When within sight of the Cardiff distant-signal I saw it showed a white light. I eased my break a little on passing the distant-signal, and on passing the level-crossing noticed the driver putting on a little steam, but I did not ease my break any more. After passing the level-crossing I went into the break-van. Shortly after I found the train had stopped, but was not aware that a collision had taken place. I looked immediately from the van, which was standing about 70 yards from the home-signal, and saw the "home" signal showed red and a glimpse of white. After the passenger train had left I walked back with the driver of my train to see what the signals showed, and found the distant-signal showing red, and the home-signal still red with a glimpse of white. Two or three of the sheets upon the wagons were grazed. I was not injured. Have been in the London and North-Western Company's service 14 to 15 years.

William Langley, signalman, Cardiff station box, says: I was on duty on the morning of the 24th instant. The London and North-Western Company's goods train was signalled to me from "Tunnel south" box at 6.28 a.m., and I gave "Line clear" for same. At that time the down line within the Cardiff station and south of my box and signals was occupied by the 6.30 a.m. up passenger train; this train being protected by my distant and home signals, which were set at danger. The passenger train had been passed from the up to the down road over the cross-over road in front of my box before I accepted block for the London and North-Western train from "Tunnel south." The points of the cross-over road remained unaltered after the passenger train went through them to the down road, and remained in readiness for the train to go out again to the up road. At 6.35 a.m. the passenger train left. The engine had passed over the cross-over road, and was upon the up line when the London and North-Western

goods train came into collision with the passenger carriage and break-van, which had not passed clear of the crossing. The points of the cross-over road stood open for the passenger train. Had they not stood correctly either the train would have gone up the down line, or have been thrown off the rails or broken the points. While those points stand open for a train to go through from down to up road it is impossible for me to lower either the down distant or down "home-signals." While the passenger train was going through the cross-over road I did not touch the lever handles of either points or signals. During all the time the passenger train was standing at the platform and going out, the down signals stood at danger. The locking machinery was and is in perfect working order. After the collision I did not touch any of my levers. Went immediately out upon the line to see what the home-signals were showing, and from the back of the London and North-Western Company's break van found the signal showing red, and no white whatever. At the same time looked at the distant-signal post, and found the back spec showing green, which indicates the front was showing danger. The locking machinery stands now in the same state as it was before the collision. No workman of any kind has touched it, nor have the signals been interfered with in any way. The arms and spectacles stand now as they did before the collision. I heard a complaint during the snow of the distant-signal, but I then worked my lever sharply, and it worked right to danger, and I kept it there for the night. It worked all right next morning. The engine of the passenger train was signalled to me from Gaol Lane box at 6.17 a.m., and arrived about 6.18. I then turned them across into the cattle-pen siding for the purpose of picking up their train, which was afterwards shunted across from the up to the down line, the passenger train being started on that side as a matter of convenience, and the train stood clear of the points on the down line. I should think the train was placed in position there at 6.23. I did not adjust my signals, because the distant-signal is fitted up with a compensator which is self-adjusting. While the passenger train stood upon the down-line at the platform clear of the points it would have been possible to alter the points of the cross-over road so as to enable the signals to have been put at all right. I did not do this. I came out of my signal-box after taking the block at 6.28 a.m. for London and North-Western train, leaving the signals at danger, and did not enter it again till after the collision. I left my box to hurry the passenger train away, as the London and North-Western was on the road. I told the guard and newspaper boy this. There was no other person in the box in the interval, and there could have been no object in altering the points. At the time of the collision the London and North-Western engine ran over the points on the down line, which were not damaged, and I worked them. Have been in the service of the Rhymney Company eight years, and have been in my present box nearly six years. The London and North-Western engine did not stop till it passed the end of our station. The driver of Rhymney train whistled just before starting.

John Thomas, driver of the Rhymney Railway Company's 6.30 a.m. passenger train *ex* Cardiff on the 24th instant.—When I arrived from the docks at the station I was shunted into the cattle-pen siding for my train. Afterwards I was shunted across to the down platform, where I stood with my train to receive the passengers and luggage. My engine was clear of the cross-over road points; and those points were not shifted from my arrival on the down line to my departure. About 6.35 a.m. I received the signal with hand lamp and "all right" by mouth from signalmen Langley, who was on the platform. I also received signal from my guard to start, and as I was leaving I saw the London and North-Western goods train coming down, and I made every effort to get my train clear of the cross-over that the train might go by,

but I did not succeed in getting the tail of my train quite clear, and the goods engine came in collision with the step of the through carriage, and with the break-van, which was the next carriage. My engine was carrying a white head light. When the collision took place, I immediately looked at the "home" signal, and found it showing a clear red light. I was not injured, nor did I jump off my engine. My engine and no vehicles of my train left the rails. I have been in the Rhymney Railway Company's service 20 years, during the whole of which time I have been a driver. Langley was in his cabin when I placed my train alongside the down platform, and I went into the signal cabin to warm my hands. Langley accompanied me when I left the cabin to go to the platform, and he certainly did not move any of the levers while I was in the cabin. Langley was still on the platform when I left. He gave me a hand signal, and spoke to me to tell me to start. There was no one in the cabin except Langley and myself. I cannot recollect whether Langley said anything about the London and North-Western train being blocked from Tunnel South cabin.

Richard Francis, fireman of the Rhymney Railway Company's 6.30 a.m. passenger train *ex* Cardiff, says: Immediately after the collision I looked at the "home" signal, and saw it showing a clear red light. The points from the cross-over road were not moved during the time we stood at the down platform, which was four to five minutes. I was not injured, and did not jump off my engine. I have been in the service of the Rhymney Railway Company between five and six years, the whole time as fireman.

John Rees, station-master at the Cardiff passenger station, says: I was on duty on the morning of the 24th inst., and saw to the despatch of the 6.30 a.m. passenger train. At 6.34 gave "all right" to the porter to start the train. Was in the station when the collision took place, but, hearing something, immediately went out, and found that the London and North-Western goods had come in contact with the outgoing passenger train, damaging the steps of the London and North-Western Company's through coach and the Rhymney Railway break-van. There was a young woman in the third-class carriage booked to Windermere. One or two of the Rhymney Railway Company's workmen were riding in the same compartment. These were the only passengers, and none of them complained of being hurt. Another break-van and carriage was obtained, and the train left at 6.50 a.m. I, immediately on coming on the platform, looked at the home-signal, and saw it showing a red light, and I also noticed the back spectacle of the distant-signal, which also indicated danger. When I went out, the London and North-Western men, I think it was the engine-driver, was saying that the signals had been at "all right" for them. Our men denied it, and the signalmen called my attention to the signals.

Mr. Richard Evans, Rhymney railway, says: I arrived at the Cardiff station at 7.15 a.m. on 24th inst., and found that the signals and locking gear were working all right. I then gave instructions that no one was to interfere in any way with the locking machinery or signals. I again, in company with Mr. Canty, went up at 5.45 p.m. same day north of the distant-signal, and examined the lights in the distant and home signals, and found them to show full danger lights. The cross-over road points from the down to the up road, and which had been run over by the London and North-Western Company's engine, were all right.

Mr. John Canty, locomotive foreman, Rhymney Railway, states: I accompanied Mr. Evans at 5.45 p.m. on 24th inst. north of the distant-signal, and confirm his statement in relation to the signal lights.

Joseph Williams.—I am porter at the Rhymney Company's passenger station, Cardiff. I was on the platform on the morning in question when the accident occurred. The signalman Langley came down from his cabin to hurry us on. The last thing we did was to light the side lights. He told me a London and North-Western train was blocked down. The newspapers were late arriving on the morning in question. It was about 6.31 a.m. when the signalman came down. About a minute after this we got the train away. I did not see the driver of our train. The guard was in his break-van after helping us with the newspapers. I did not notice the signalman at all.

Shadrach Watkins.—I was guard of the 6.30 a.m. passenger train from Cardiff to Rhymney on 24th January. My train consisted of a tender engine (engine in front), two composite carriages, and a break-van, in which I travelled. The engine was getting the carriages out of the sidings when I arrived at the station. I booked my parcels out of the office first.

I was on the platform at the time the train was backed to the platform. This was about 6.23 a.m. I did not notice the driver going into the signalman's cabin. When I was putting the parcels in the van I saw the signalman come down from the cabin to hurry us on, as he said a train was coming down. I got on as fast as I could. The foot-warmers were put in the carriages, and doors locked next the down platform, as the passenger train was on its wrong road; then the lamps were lit at the tail of the train, and it started. I think it was over a minute, probably two, from the time the signalman spoke to me until the train started. I jumped into my van when the train started, and as I was looking at my watch just after starting I was thrown to the other side of my van, and there was a great crash of something running into my van. The side of my van was broken, but I do not think it left the rails. The carriage next my van was slightly damaged by being struck by the engine of the London and North-Western goods train. I have been a guard on the Rhymney railway 13 years.

Conclusion.

This collision was caused by the neglect of the engine driver of the London and North-Western goods train, who appears to have run past the Cardiff down distant and home signals while these signals were standing at danger. The evidence is very conflicting. The engine driver, fireman, and guard in charge of the London and North-Western train stated that these signals were showing a white light "all right," whereas all the servants of the Rhymney Company stated that these signals were at danger.

All parties admit they were at danger after the accident occurred; and there can be no doubt, from the nature of the locking arrangements, which are in very good order, and have not been altered since the collision, as well as the circumstance of the signalman not being in his cabin at the time, and who could not therefore have moved these signals just before the train arrived, that they must have been at danger when the driver and other servants with the London and North-Western train came in sight of and passed them.

This collision shows one of the many disadvantages of starting trains from the platform at the wrong side of the line. There are platforms at both sides of the Rhymney Company's Cardiff station, which are provided with proper shelter. I recommend that in future the trains should be started from their proper platforms, as this will not only prevent collisions of this kind, but also prevent the danger of the passenger trains working over points which become facing-points when the up and down lines are improperly used.

The Secretary,
Board of Trade (Railway Department).

I have, &c.,
F. H. RICH,
Colonel, R.E.

Printed copies of the above Report were sent to the London and North-Western and the Rhymney Railway Companies on the 17th February.

SOUTH-EASTERN RAILWAY.

SIR,

Chester, 3rd February 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 27th ultimo, the result of my inquiry into the circumstances connected with an accident that occurred on the 24th ultimo to a down passenger train in the act of leaving the Cannon Street station of the South-Eastern Railway, when two carriages were pulled off the rails on which they were travelling, and one of them was thrown over on its side.

It is stated that one passenger was injured.

The carriage which was dragged off the rails and upset had its side and end broken, and that behind it, which was also off the rails, had one corner damaged. The draw-bars of the carriage which was upset, and that next in front of it, were broken, as well as one of the side chains.

Description.

The train which met with the accident was the 9.5 a.m. down passenger train from Charing Cross to Maidstone, calling at Cannon Street on the way. It had left the general departure platform on the eastern side of the Cannon Street station, having stood on No. 7 line of rails on the eastern side of that platform; the engine standing at the south end of the train, about 50 yards north of the overhead signal-box at Cannon Street station, and the signal No. 7, giving permission for the train to leave, is placed immediately above the signal-box. A pair of facing-points, on the east departure line, on which the train had to travel across the river, are situated about 45 yards south of the overhead signal-box, and these were properly interlocked by No. 7 signal lever, when it was lowered for the train to leave the station platform; but as soon as that signal was replaced at "danger" the interlocking was removed, and the signalman could shift the facing-points, as there was no locking-bar in front of them to prevent their being moved while the carriages were passing over them.

Evidence.

Robert Sullivan, relieving signalman 18 months, and 2½ years in the Company's service, states:—I came on duty at 7 a.m. on the 24th instant at the Cannon Street station signal-box. About 9.20 a.m. the 9.5 a.m. passenger train from Charing Cross to Maidstone was leaving the Cannon Street station, and I took off the down signal for No. 7 road, and when the train had passed about three quarters of its length beyond my signal box I put that down signal back to "danger." That train left the eastern side of the platform. I had received a telegraphic signal from Stoney Street signal-box for another down train from Charing Cross, calling at Cannon Street,—the 9.10 a.m. down train from Charing Cross to Woolwich,—and it was waiting outside the Cannon Street west arrival down distant-signal, which stood at "danger" against it. I did not take off that down distant-signal, but I shifted levers 62 and 63 in order to get the train on to the east arrival road, and then I shifted Nos. 54 and 55 levers, thus moving the points for the down train to get to the east departure road, on which the 9.5 a.m. down train was then leaving the station. I forgot when I pulled over levers 62 and 63 that this train was then leaving the station, and I did not discover that I had made this mistake until I looked out of the window, and saw that a carriage was off the road and lying on its side. I could not see very clearly what had happened, owing to the steam from an engine standing on the engine siding. This occurred between 9.20 and 9.25 a.m. The down distant-signal (which in this instance was virtually a stop-signal) had not been taken off for the 9.10 a.m. down train.

William Tickenor, driver 9 years, and about 20 years in the Company's service, states:—I was driving engine 274 with the 9.5 train from Charing Cross to Maidstone on the 24th instant. I had a tender engine, and was running with the engine in front, and had 14 vehicles attached, including two break vans with

two guards, one at each end of the train. I knew that I had to leave the Cannon Street station on the straight road, for which No. 7 signal was lowered, and the facing-points were all right, as I passed over them all right, and when about 11 carriages had passed the facing-points I felt a jerk, and I at once shut off steam, and my mate put on the tender break. I did not whistle for the breaks. On looking back I saw that a carriage was off the road; that was the ninth carriage from the tender. I believe that was the only carriage off the rails, and when I first saw it, that carriage was on its wheels, but subsequently it fell over on its side. I think I was not travelling more than five miles an hour when I passed over the facing-points. I believe that four other carriages, besides the one that fell over on its side, had been diverted to the cross-over road. The left side chain still connected the ninth vehicle with the eighth vehicle at the tail of my train. I got off my engine and went back. I believe all the carriages behind the ninth were all coupled together. The ninth carriage was thrown right over on its side. I think there were four passengers in the ninth carriage, which was a composite (1st and 2nd) carriage. I saw one gentleman had received a cut on the head. We left Cannon Street station at 9.22 a.m. I took on six vehicles of my train after a delay of about a quarter of an hour.

George Abbott, station-master at Cannon Street station:—The signalman Sullivan was doing duty for a signalman who was ill. He is a very careful, steady man, and an excellent signalman. The carriage which fell over on its side had one side and end broken, and the draw-bars of the eighth and ninth carriages were both broken, and the right side chains between those vehicles were also broken. The corner of the tenth carriage was also damaged; it was off the rails of the cross-over road, but standing on its wheels. Both carriages were 4-wheeled carriages.

Conclusion.

This accident was occasioned by a mistake of the signalman on duty, in having forgotten that the 9.5 a.m. down passenger train to Maidstone was leaving the Cannon Street station, when he proceeded to make the road right for the entry into the station of the 9.10 a.m. down passenger train from Charing Cross to Cannon Street, and thence on to Woolwich; and this he proceeded to do by first shifting the points at the cross-over road between the west arrival and the east arrival roads, by means of levers 62 and 63, and then by shifting the points of the cross-over road between the east arrival and the east departure roads, by moving levers 54 and 55.

He states that about three-quarters of the length of the 9.5 a.m. passenger train had passed under his box when he replaced signal No. 7 at "danger," and as soon as he had done this, the facing-points on the east departure line on which that train was travelling were unlocked, and could be, and were, shifted by the moving of No. 54

lever; and thus while the front part of the train, which had passed over the points before they were moved, continued to travel on the east departure line, the rear part of the train, commencing at the ninth carriage from the engine, was diverted by the shifting of those points to the cross-over road to the east arrival line, and thence by the next cross-over road, whose points had been shifted by levers 62 and 63, towards the west arrival line.

The ninth and tenth carriages were pulled off the rails, and the leading carriage, the ninth, was thrown over on its left side, about 100 yards beyond the facing-points on the east departure road, to which it was improperly diverted by the act of the signalman Sullivan.

This man is described as being a very careful, steady man, and an excellent signalman. He made a mistake, and freely admits that he did so; but it must frequently happen in this station yard that the signalman cannot actually see when the last carriage of a passenger train has passed over the facing-points. Two similar accidents occurred at two different sets of facing-points in this station yard in 1875, which were reported upon by Sir Henry W. (then Captain) Tyler; and a like accident occurred on the 5th November last, on which I reported on the 16th of that month.

Most fortunately in this instance the signalman had not taken off the distant-signal, acting also as a stop-signal, for the 9.10 a.m. down passenger train from Charing Cross to Woolwich, which was waiting outside the stop-signal for permission to enter the Cannon Street station, when he discovered the mistake he had made, or it might have run into the carriage which was upset and lying on the rails.

The Cannon Street station yard is full of facing-points, worked from the Cannon Street overhead signal-box, but not protected by locking-bars to prevent their being shifted by the signalman through inadvertence while a train is in the act of passing over them.

I had occasion to remark, when reporting on the accident of the 5th November last, that if the Railway Company are unable to fit locking-bars in front of these facing-points, or to prohibit the signalmen, in any cases, from replacing the signals at "danger" until the whole of the vehicles of each train have passed over the facing-points, the only alternative appeared to be that the lines in this station yard should be so arranged as to admit the whole of the facing-points being properly controlled by facing-point locks and locking-bars, so that the lives of passengers may not be unnecessarily endangered.

In reference to Mr. Gladwell's complaint of the "excessively worn condition of the metals, more particularly where the rails run one into the other," I have to state that I have walked through the station yard, and beg to say that the rails generally are in very fair condition,—some few are a good deal spread on the outer edges of the rails,—and in several cases new rails are lying alongside ready to be put into the different roads. What probably attracted Mr. Gladwell's attention was the state of the check rails, which in many cases are a good deal worn, but their state does not render the travelling unsafe.

The Secretary,
(Railway Department,)
Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above Report were sent to the Company on the 26th March.

SOUTH-EASTERN RAILWAY.

Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 27th March 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 14th instant, the result of my inquiry into the circumstances connected with the accident which occurred on the night of the 10th instant, at Deptford station, on the South-Eastern Railway.

In this case the 11.32 p.m. down passenger train (consisting of engine, running tender first, guard's break-van, nine carriages, and guard's break-van) from Charing Cross for Woolwich overran the platform at Deptford for a considerable distance, viz., about 60 yards, and just as the train stopped a passenger opened a door in the carriage next to the front van, stepped on to the top of the parapet wall of the viaduct,—the

top of which is nearly on a level with the carriage floors,—and thence fell to the ground, a height of about 24 feet.

He was immediately picked up in a state of insensibility, bleeding from the mouth, nose, and ears, and was taken in an ambulance to the Dreadnought Hospital, where he was found to have had three ribs broken, and to be otherwise seriously injured. He is, however, stated to be going on favourably.

Description.

Deptford station—the state of which, in consequence of a complaint, formed the subject of a report to the Board of Trade in April 1877, and of further communication with the company, in consequence of a fresh complaint, in June 1878—is one of the very worst now existing in the neighbourhood of London; on both up and down platforms, which have each an available length of 125 yards, there are portions of about 16 yards length having a width of no more than 4 feet, in addition to which the verandah pillars on the down side are dangerously close to the platform edge. At both ends of the up platform, and at the down end of the down platform, the inner face of the parapet wall of the viaduct, which carries the Greenwich lines, comes within 3 feet of the outer edge of the rail, the top being 3 feet 9 inches above the rail level, or very slightly below the floor level of the carriages; it being, consequently, an easy step from a carriage door to the top of the parapet wall. This wall is about 18 inches thick, the top being about 24 feet above the ground below. There is no railing of any description on the top of the wall in the proximity of the station, to guard against such an accident as the present, viz., from a down train overrunning or from an up train overrunning or stopping short.

The line near Deptford is level.

Evidence.

1. *George Cronk*, driver 14 years, on the Greenwich line all the time off, and on.—I joined the 11.32 p.m. down train at Cannon Street with engine No. 34, a tender engine, running tender first; four rear wheels coupled; the ordinary hand-break on the six tender wheels; no breaks on the engine wheels, and no continuous breaks on the train, which consisted of eleven vehicles with two guards. We left Cannon Street at right time, 11.42. At London Bridge I did not overrun the platform, but might have done so had I not reversed my engine and got steam against it, the rails being very greasy. We left London Bridge at right time, viz., about 11.46. At Spa Road I stopped all right without reversing, and left it at right time, viz., 11.49. I then got clear signals to Deptford. The rails being greasy I shut off steam rather sooner than usual had the rails been dry, the speed being 27 or 28 miles an hour, about the regular speed. Before getting to the engine sheds I found I should overrun the end of the platform, and consequently reversed the engine and got steam against it. The breaks had been applied when I shut off steam, and were never released. Notwithstanding these measures I overran the end of the platform by the amount pointed out on the ground, viz., about 58 yards. I cannot say that the guards' breaks were not properly applied. I whistled for the guards' breaks by the distant-signal, and kept the whistle open for a few seconds. I applied sand when drawing down towards the engine shed, both from the engine and tender sand-boxes. The engine sand-box delivers sand on both rails in front of the driving wheels. The tender sand-box delivers its sand in front of one of the tender wheels, and was therefore a help to the engine's reversing action. The sand-boxes remained open up to the time we stopped. After stopping and getting a signal from the front guard, I set back to the platform. I saw nothing of the passenger getting out, and had got back to the platform before I knew any accident had happened, and then I heard some one say a person had fallen over the wall. There was a moon, but it was overcast. I started again at once after the station work had been done. My engine was a moderately heavy one, and in perfectly good order. The engine did not pick up at once on my reversing.

(Cronk bears a good character as regards previous accidents.)

2. *Edward Surridge*, fireman seven years, with Cronk about four months.—I had charge of the tender break; it was in good order, the blocks biting properly, one on each of the six tender wheels. At London Bridge we had a difficulty in stopping owing to the greasy state of the rails, but we did not overrun, as my mate reversed in time. We approached Deptford station rather faster than usual, due again to the greasy state of the rails. My break had been applied about 100 yards before I reached the distant-signal. The driver eased steam going through North Kent junction, and shut it off about 50 yards past the corner of the wall, the usual place for shutting off steam; with greasy rails it would be shut off earlier. On nearing the station I made the remark, "We are not going to stop." He then whistled for the guards' breaks and reversed just this side of the engine shed. When we stopped I was standing on the 6-ft. side of the engine. My mate said we had a signal to go back, and we did so, seeing nothing of the accident which had occurred. We pulled up gradually, not sharply, towards the end of the stop.

3. *William Wash*, guard 13 months.—I was riding in the rear van of the 11.32 p.m. train from Charing Cross to Cannon Street, and was afterwards in the front van. At London Bridge we ran further down the platform than usual, but not so as to overrun; the rails were very greasy. On approaching Deptford I applied my break 100 yards sooner than usual (just after passing North Kent junction signal-cabin), on account of the state of the rails and of the speed appearing higher than usual. I heard the driver give a break whistle when he was near to Deptford distant-signal at which time my break was on. I could not see for the beating rain what was being done on the engine. About the engine shed our speed was such that I made sure we should overrun the end of the platform, and we did so by five carriages. As soon as we stopped I looked out of the window and saw a door open in the second front compartment of the next carriage to the break, and called out that the door was open. I saw no one come out of the door, which was at once shut. I gave the driver no signal to set back, and the only signal I saw shown was a red light from the rear guard. The train then set back, and on reaching the platform I was informed by one of the passengers that a man had stepped over

the wall from the compartment of which I had seen the door open. I went to look over the wall, but could see nothing on account of the state of the night. I informed the inspector on duty of what had happened. I have never overrun Deptford platform before.

4. *William R. Jesson*, guard five years.—I was in charge of the 11.32 p.m. train from Charing Cross to Woolwich. It consisted of van, three third-class carriages, three composites, three third class, and another van. From Cannon Street I was in the rear van. At London Bridge we ran further down the platform than usual, owing to the greasy state of the rails. We left it at 11.47, a minute late. We were a minute late at Spa Road. The speed seemed more than usual in approaching Deptford. I put my break on about North Kent junction, the usual place with greasy rails. I did not hear the driver whistle for the breaks. Before reaching the engine-shed I was sure we should overrun. On stopping I showed the driver a red light, to prevent him setting back till the doors were shut, but he came back almost at once without any signal from me. I saw nothing of the accident, and knew nothing about it until the train had set back. We left Deptford at 11.57 or 58, two or three minutes late. I never remember a previous overrun at Deptford.

5. *William Hester*, inspector at Deptford station

for six months.—I was standing at the London end of the down platform when the 11.32 p.m. train was running in. Looking at the state of the rails I was sure the speed was too great for it to stop at the end of the platform. I did not see any steam on, nor whether the engine was reversed. I cannot speak as to the state of the breaks, whether applied or not. The speed was about 10 or 11 miles an hour. I followed the train up pretty fast, and had got two carriages up the train when it began to set back, without any signal from me, or any other that I saw. Guard Jesson gave a red light, but the train was then in backward motion. I saw nothing of the accident, but was informed of it by a passenger (a policeman), who said he had been in the same compartment with the man who met with the accident, and was about following him out, when he exclaimed, "Mind, old fellow, how you step out here, it is dangerous," and he then saw him disappear. I did not ask him whether he had got out before the train stopped. As soon as the train had started I went down to look for the man who had fallen down, having previously sent on two porters. I found him lying on his left side with his head next the arches, quite unconscious, bleeding from the nose, ears, and mouth; no wounds visible, or bones apparently broken. He was first removed to a neighbouring public-house, and thence, in less than an hour, to the Dreadnought Hospital in an ambulance. I have been informed that he had three ribs broken, besides other injuries.

Conclusion.

This accident occurred—(1.) From want of judgment on the part of the driver of the 11.32 p.m. down train in approaching Deptford station (on a night when the rails were, as he knew, in a very greasy condition) at so high a speed that, notwithstanding his having reversed his engine and put steam against it some 200 yards from the point at which he ought to have stopped, he nevertheless overran the platform about 60 yards. (2.) From want of a railing on the top of the parapet wall of the viaduct, which railing should be provided in all cases for a reasonable distance beyond the ends of the platforms in stations on viaducts, wherever it is possible for accidents to occur in the dark from passengers stepping from the carriages on to the top of the walls, in case of trains overrunning or stopping short.

When I inspected Deptford station, in consequence of a complaint as to its platform accommodation, in April 1877, the engineer informed me that he had received instructions to improve the station generally, and that if the necessary improvements could not be effected on land which would become available on pulling down the existing engine sheds (to be removed to Charlton on the opening of the Greenwich and Woolwich line), parliamentary powers for acquiring additional land would be applied for in the session of 1878.

The engineer was unable to be present at my inquiry to-day in consequence of having to attend a parliamentary committee, but in answer to a note which I wrote to him to ask how he accounts for nothing having yet been done at Deptford, notwithstanding what he told me in April 1877, I have received the following reply:—

"The directors are this session applying for powers to purchase a large quantity of additional land in the neighbourhood of Deptford, with the object of making improvements in the conduct of their traffic. These improvements may render it necessary to shift the position of Deptford station."

From this reply it would almost seem that there is less probability now of any immediate improvement in the exceedingly defective condition of Deptford station than there was two years since.

The Secretary,
Railway Department, Board of Trade.

I have, &c.
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above Report were sent to the Company.

RAILWAY ACCIDENTS.

RETURNS
OF
ACCIDENTS AND CASUALTIES

**AS REPORTED TO THE BOARD OF TRADE BY THE SEVERAL RAILWAY COMPANIES
IN THE UNITED KINGDOM,**

During the Six Months ending 30th June 1879,

In pursuance of the Regulation of Railways Act (1871), 34 & 35 Vict. cap. 78;

TOGETHER WITH

**REPORTS OF THE INSPECTING OFFICERS OF THE
RAILWAY DEPARTMENT TO THE BOARD OF TRADE**

UPON

CERTAIN ACCIDENTS

Which were inquired into.

**Presented to both Houses of Parliament by Command of Her Majesty.
25 July 1879.**



LONDON:
PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
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1879.

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Summary of Accidents and Casualties which have been reported to the Board of Trade as having occurred upon the Railways in the United Kingdom, during the six months ending 30th June 1879.

1.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c.

Accidents to trains, rolling-stock, permanent-way, &c. caused the death of 2 persons and injury to 270, viz. :—

		Killed.	Injured.
Passengers	- - - - -	—	227
Servants of companies	- - - - -	1	43
Other persons	- - - - -	1	—
Total	- - - - -	2	270

During the six months there were reported 11 collisions between passenger-trains or parts of passenger-trains, by which 65 passengers and 1 servant were injured; 38 collisions between passenger-trains and goods or mineral-trains, engines, &c., by which 1 servant was killed and 114 passengers and 21 servants were injured; 11 collisions between goods-trains or parts of goods-trains, by which 14 servants were injured; 33 cases of passenger-trains or parts of passenger-trains leaving the rails, by which 5 passengers were injured; 4 cases of trains or engines travelling the wrong direction through points, by which 8 passengers and 1 servant were injured; 7 cases of trains running into stations or sidings at too high a speed, by which a man who had come to a station on business was killed, and 33 passengers were injured; 603 failures of tyres, 2 servants being injured; 217 failures of axles, 2 passengers and 2 servants being injured; 2 failures of ropes used in working inclines, 1 servant being injured; and 1,282 broken rails, 1 servant being injured.

Of other casualties, in which no personal injury was inflicted, there were 3 cases of goods-trains or parts of goods-trains, engines, &c. leaving the rails; 62 cases of trains running over cattle or other obstructions on the line; 28 cases of trains running through gates at level-crossings; 5 cases of failure of machinery, springs, &c. of engines; 15 failures of wheels; 6 failures of couplings; 1 failure of a bridge; 1 case of flooding of portion of permanent-way; 6 slips in cuttings or embankments; 1 fire in a train; and 1 other accident.

Of the 603 tyres which failed, 32 were engine-tyres, 13 were tender-tyres, 2 were carriage-tyres, 18 were van-tyres, and 538 were wagon-tyres; of the wagons, 422 belonged to owners other than the railway companies; 464 tyres were made of iron, and 129 of steel, while the material of 10 was not stated; 38 of the tyres were fastened to their wheels by Gibson's patent method, 16 by Beattie's patent, 5 by Mansell's patent, and 2 by Brotherhood's patent, all of which remained on their wheels when they failed; 537 tyres were fastened to their wheels by bolts or rivets, of which 9 left their wheels when they failed; 5 tyres were secured to their wheels by various other methods; 95 tyres broke at rivet-holes, 123 in the solid, 12 at the weld, and 373 split longitudinally or bulged.

Of the 217 axles which failed, 114 were engine-axles, viz., 102 crank or driving, and 12 leading or trailing; 7 were tender-axles, 1 was a carriage-axle, 91 were wagon-axles, and 4 were axles of salt-vans. 40 wagons, including the salt-vans, belonged to owners other than the railway companies. Of the 102 crank or driving-axles, 78 were made of iron, and 24 of steel. The average mileage of 71 iron axles was 198,568 miles, and of 21 steel axles 144,813 miles.

Of the 1,282 rails which broke, 1,189 were double-headed, 72 were single-headed, 9 were of the bridge pattern, and 11 were of Vignoles' section, whilst the section of 1 was not stated; of the double-headed rails, 760 had been turned; 1,131 rails were made of iron, and 151 of steel.

II.—ACCIDENTS TO PASSENGERS FROM CAUSES OTHER THAN ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., INCLUDING ACCIDENTS FROM THEIR OWN WANT OF CAUTION, OR MISCONDUCT; ACCIDENTS TO PERSONS PASSING OVER LEVEL-CROSSINGS; TRESPASSERS; AND OTHERS.

Of the 214 persons killed and 307 injured in this division, 34 of the killed and 215 of the injured were passengers. Of the latter, 11 were killed and 19 injured by falling between carriages and platforms, viz., 6 killed and 12 injured when alighting from, and 5 killed and 7 injured when getting into trains; 4 were killed and 154 injured by falling on to platforms, ballast, &c., viz., 4 killed and 142 injured when alighting from, and 12 injured when getting into trains; 10 were killed and 4 injured whilst passing over the line at stations; 13 were injured by the closing of carriage-doors; 4 were killed and 11 injured by falling out of carriages during the travelling of trains; and 5 were killed and 14 injured from other causes. 27 persons were killed and 14 injured whilst passing over railways at level-crossings, viz., 17 killed and 11 injured at public level-crossings, 8 killed and 2 injured at occupation crossings, and 2 killed and 1 injured at foot-crossings. 118 persons were killed and 46 injured when trespassing on the railways; 21 persons committed suicide on railways; and of other persons not specifically classed, but mostly private people having business on the Companies' premises, 14 were killed and 32 injured.

III.—ACCIDENTS TO SERVANTS IN THE EMPLOY OF RAILWAY COMPANIES OR CONTRACTORS, CAUSED BY THE TRAVELLING OF TRAINS OR THE MOVEMENT OF VEHICLES USED EXCLUSIVELY UPON RAILWAYS.

During the six months there were 188 servants of companies or contractors reported as having been killed and 820 injured, in addition to those included in Division I.* Of these 9 were killed and 145 injured whilst coupling or uncoupling vehicles; 1 was killed and 22 were injured by coming in contact, whilst riding on vehicles during shunting, with other vehicles, &c., standing on adjacent lines; 25 were injured whilst passing over or standing upon buffers during shunting; 11 were killed and 110 injured in getting on or off, or by falling off engines, wagons, &c. during shunting; 2 were killed and 46 injured whilst breaking, spragging, or chocking wheels; 7 were killed and 26 injured whilst attending to ground points, marshalling trains, &c.; 2 were killed and 47 injured whilst moving vehicles by capstans, turn-tables, props, &c., during shunting, and 10 were killed and 77 injured by various other accidents during shunting operations; 8 were killed and 10 injured by falling off engines, &c., during the travelling of trains; 2 were killed and 16 injured by coming in contact with over-bridges or erections on the sides of the line during the travelling of trains; 5 were killed and 17 injured whilst getting on or off engines, vans, &c. during the travelling of trains; 1 was killed and 26 were injured whilst attending to, or by the failure of, machinery, &c. of engines in steam; 39 were killed and 61 injured whilst working on the permanent-way, sidings, &c.; 1 was killed and 2 were injured whilst attending to gates at level-crossings; 53 were killed and 66 injured whilst walking, crossing, or standing on the line on duty; 12 were killed and 56 injured by being caught between vehicles; 13 were killed and 34 injured by falling or being caught between trains and platforms; 10 were killed and 14 injured whilst walking, &c. on the line on the way home or to work; and 2 were killed and 20 injured from various other causes.

Altogether, the numbers of persons killed and injured on railways in the United Kingdom in the course of public traffic, during the six months ending 30th June 1879, as reported to the Board of Trade, were as follows:—

	Killed.	Injured.
Passengers:		
From accidents to trains, rolling-stock, permanent-way, &c.	—	227
By accidents from other causes	34	215
Servants of companies or contractors:		
From accidents to trains, rolling stock, permanent-way, &c.	1	43
By accidents from other causes	188	820
Persons passing over railways at level-crossings	27	14
Trespassers (including suicides)	139	46
Other persons not coming in above classification	15	32
Total	404	1,397.

* For a classification of the injuries, see Table No. 6.

Note.—In addition to the above, the Railway Companies have reported to the Board of Trade, in pursuance of the 6th Section of the Regulation of Railways Act, 1871, the following accidents which occurred upon their premises, but in which the movement of vehicles used exclusively upon railways was not concerned, namely:—43 passengers injured whilst ascending or descending steps at stations; 14 injured by being struck by barrows, falling over packages, &c. on station platforms; 11 injured by falling off platforms; and 1 killed and 14 injured from other causes. Of servants of companies or contractors 1 was killed and 194 were injured whilst loading, unloading, or sheeting wagons; 65 were injured whilst moving or carrying goods in warehouses, &c.; 3 were killed and 56 injured whilst working at cranes or capstans; 2 were killed and 44 injured by the falling of wagon-doors, lamps, bales of goods, &c.; 14 were injured by falling off, or when getting on or off, stationary engines or vehicles; 2 were killed and 74 injured by falling off platforms, ladders, scaffolds, &c.; 1 was killed and 57 were injured by stumbling whilst walking on the line or platforms; 35 were injured whilst attending to stationary engines in sheds; 12 were injured by being trampled on or kicked by horses; 6 were killed and 108 injured whilst working on the line or in sidings; and 50 were injured from various other causes. 4 persons who were transacting business on the companies' premises were also killed and 35 were injured, making a total in this class of accidents of 20 persons killed and 953 injured.

Thus the total numbers of personal accidents reported to the Board of Trade by the several railway companies during the six months amount to 424 persons killed and 2,350 injured.

TABLE No. 1.
GENERAL TOTAL.

NUMBER of PERSONS reported, during the Six Months ending 30th June 1879, as KILLED or INJURED on the Railways of the UNITED KINGDOM, distinguishing between PASSENGERS, SERVANTS of the COMPANIES or of CONTRACTORS, and OTHER PERSONS ; and distinguishing also in the case of the Two former Classes between ACCIDENTS caused by ACCIDENTS to TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., and ACCIDENTS happening otherwise.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
From accidents to trains, rolling-stock, permanent-way, &c. -	-	202	-	15	-	10	-	227
By accidents from other causes, including accidents from their own want of caution, or misconduct - - -	30	206	4	8	-	1	34	215
SERVANTS :—								
From accidents to trains, rolling-stock, permanent-way, &c. -	-	30	1	13	-	-	1	43
By accidents from other causes, including accidents from their own want of caution, or misconduct - - -	139	674	39	142	10	4	188	820
OTHER PERSONS :—								
Whilst passing over railways at level-crossings - -	26	11	1	1	-	2	27	14
Trespassers - - -	88	36	22	9	8	1	118	46
Suicides - - -	16	-	3	-	2	-	21	-
Miscellaneous, not included in either of the above - -	15*	25	-	6	-	1	15*	32
TOTAL - -	314	1,184	70	194	20	19	404	1,397

N.B.—The Board of Trade state the cause of accident as returned by the Companies, but do not guarantee or otherwise adopt the statement, except in cases where an official inquiry has been held.

* One of these was a man who was killed by a train running into a station at too high a speed. See page 30.

TABLE No. 2.

NUMBER OF PERSONS reported, during the Six Months ending 30th June 1879, as KILLED or INJURED in the UNITED KINGDOM by the TRAVELLING of TRAINS or the MOVEMENT of VEHICLES used exclusively upon Railways, distinguishing between PASSENGERS, SERVANTS of RAILWAY COMPANIES, and OTHER PERSONS, and classifying as far as practicable the Nature and Causes of the Accidents occasioning the Death or Injury.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
From accidents to trains, &c., <i>see Table No. 3.</i>	—	202	—	15	—	10	—	227
From falling between trains and platforms	8	16	3	3	—	—	11	19
From falling on to the platform, ballast, &c. when getting into or out of trains	4	151	—	3	—	—	4	154
Whilst crossing the line at stations	10	4	—	—	—	—	10	4
By the closing of carriage doors	—	13	—	—	—	—	—	13
From falling out of carriages during the travelling of trains	3	10	1	1	—	—	4	11
By other accidents	5	12	—	1	—	1	5	14
TOTAL	30	408	4	23	—	11	34	443
SERVANTS :—								
From accidents to trains, &c., <i>see Table No. 3.</i>	—	30	1	13	—	—	1	43
Whilst coupling or uncoupling vehicles	6	116	3	29	—	—	9	145
By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines	1	18	—	4	—	—	1	23
Whilst passing over or standing upon buffers during shunting	—	17	—	8	—	—	—	25
When getting on or off or falling off engines, waggons, &c., during shunting	5	82	6	27	—	1	11	110
Whilst breaking, springing, or chocking wheels	2	39	—	7	—	—	2	46
Whilst attending to ground-points, marshalling trains, &c.	4	20	3	6	—	—	7	26
Whilst moving vehicles by capstans, turntables, props, &c., during shunting	1	44	1	3	—	—	2	47
By other accidents during shunting operations, not included in the preceding	7	63	2	14	1	—	10	77
From falling off engines, &c., during the travelling of trains	6	5	—	4	2	1	8	10
By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains	2	13	—	3	—	—	2	16
When getting on or off engines, vans, &c., during the travelling of trains	4	15	1	2	—	—	5	17
Whilst attending to, or by the failure of machinery, &c. of engines in steam	1	23	—	3	—	—	1	26
Whilst working on the permanent-way, sidings, &c.	32	53	6	8	1	—	39	61
Whilst attending to gates at level-crossings	1	2	—	—	—	—	1	2
Whilst walking, crossing, or standing on the line on duty	40	56	12	10	1	—	53	66
From being caught between vehicles	10	49	2	7	—	—	12	56
From falling or being caught between trains and platforms, walls, &c.	11	31	1	3	1	—	13	34
Whilst walking, &c., along the line on the way home or to work	4	11	2	1	4	2	10	14
Miscellaneous	2	17	—	3	—	—	2	20
TOTAL	139	704	40	155	10	4	139	863
OTHER PERSONS :—								
Whilst passing over railways at level crossings	26	11	1	1	—	2	27	14
Trespassers	88	36	22	9	8	1	118	46
Suicides	16	—	3	—	2	—	21	—
Miscellaneous	15*	25	—	6	—	1	15*	32
TOTAL	145	72	26	16	10	4	181*	92
SUMMARY :—								
Passengers	30	408	4	23	—	11	34	443
Servants	139	704	40	155	10	4	139	863
Other persons	145	72	26	16	10	4	181	92
TOTAL ALL CLASSES	314	1,184	70	194	20	19	404	1,397

* See note to Table 1.

TABLE No. 3.

ACCIDENTS to TRAINS, ROLLING STOCK, PERMANENT WAY, &c., reported, during the Six Months ending 30th June 1879, as having occurred on the RAILWAYS in the UNITED KINGDOM, distinguishing the different Classes of Accident, and the Number of Passengers and others, and of Servants of Railway Companies, KILLED or INJURED in each Class of Accident.

	NUMBER OF CASES.				NUMBER OF PASSENGERS AND OTHERS.								NUMBER OF SERVANTS.							
	England and Wales.	Scotland.	Ireland.	United Kingdom.	England and Wales.		Scotland.		Ireland.		United Kingdom.		England and Wales.		Scotland.		Ireland.		United Kingdom.	
					Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Collisions between passenger trains or parts of passenger trains - - -	11	-	-	11	-	65	-	-	-	-	-	65	-	1	-	-	-	-	-	1
Collisions between passenger trains and goods or mineral trains, engines, and vehicles standing foul of the line -	25	11	2	38	-	90	-	14	-	10	-	114	-	13	1	8	-	-	1	21
Collisions between goods trains or parts of goods trains -	9	2	-	11	-	-	-	-	-	-	-	-	-	11	-	3	-	-	-	14
Trains coming in contact with projections from other trains travelling on parallel lines -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Passenger trains or parts of passenger trains leaving the rails - - -	16	15	2	33	-	5	-	-	-	-	-	5	-	-	-	-	-	-	-	-
Goods trains or parts of goods trains, engines, &c. leaving the rails - - -	2	1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trains or engines travelling in the wrong direction through points - - -	3	1	-	4	-	8	-	-	-	-	-	8	-	1	-	-	-	-	-	1
Trains running into stations or sidings at too high a speed - - -	7	-	-	7	1*	33	-	-	-	-	1*	33	-	-	-	-	-	-	-	-
Trains running over cattle or other obstructions on the line	54	8	-	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trains running through gates at level-crossings - -	26	2	-	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The bursting of boilers or tubes, &c. of engines -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The failure of machinery, springs, &c. of engines -	4	1	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The failure of tyres - -	559	39	5	603	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2
" " wheels -	14	1	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " axles -	161	47	9	217	-	1	-	1	-	-	-	2	-	-	-	2	-	-	-	2
" " break apparatus -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " couplings -	2	1	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" " ropes used in workinginelines	2	-	-	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
" " tunnels, bridges, viaducts, culverts, &c.	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Broken rails - - -	272	1,009	1	1,282	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
The flooding of portions of permanent-way - -	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Slips in cuttings or embankments - - -	6	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire in trains - - -	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire at stations, or involving injury to bridges or viaducts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other accidents - - -	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL -					1*	202	-	15	-	10	1*	227	-	30	1	13	-	-	1	43

* See note to Table 1.

TABLE No. 4.

ACCIDENTS to TRAINS, ROLLING STOCK, PERMANENT WAY, &c. on the RAILWAYS in the UNITED KINGDOM, reported on which the same have occurred, and the Number of Passengers and others, and of

NAME OF COMPANY.	Col- lisions between pas- senger trains or parts of pas- senger trains.	Col- lisions between pas- senger trains, and goods or mineral trains, engines, &c.	Col- lisions between goods trains or parts of goods trains.	Trains coming in contact with pro- jections from other trains travel- ling on parallel lines.	Pas- senger trains or parts of pas- senger trains leaving the rails.	Goods trains or parts of goods trains, engines, &c. leaving the rails.	Trains or engines travel- ling in the wrong direction through points.	Trains running into stations or sidings at too high a speed.	Trains running over cattle or other obstruc- tions on the line.	Trains running through gates at level- cross- ings.	The bursting of boilers or tubes, &c. of engines.	The failure of ma- chinery, springs, &c. of engines.	The failure of tyres.
ENGLAND AND WALES.													
Aylesbury and Buckingham	-	-	-	-	1	-	-	-	-	-	-	-	-
Brecon and Merthyr Tydfil Junction	-	-	-	-	-	2	-	-	-	-	-	-	-
Cambrian - - -	-	-	-	-	1	-	-	-	-	-	-	1	-
Cheshire Lines - -	-	-	-	-	-	-	-	-	-	-	-	1	-
Cornwall - - -	-	-	1	-	-	-	-	-	1	-	-	-	2
Festiniog - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
Furness - - -	1	-	-	-	-	-	-	-	-	-	-	-	6
Great Eastern - -	1	1	1	-	2	-	-	2	7	19	-	-	5
Great Northern - -	1	-	-	-	-	-	-	1	-	-	-	1	4
Great Western - -	-	4	1	-	1	-	1	-	5	5	-	-	41
Lancashire and Yorkshire -	1	1	8	-	3	-	1	-	3	1	-	-	11
Lancashire and Yorkshire and Lancashire Union Joint - - -	-	1	-	-	-	-	-	-	-	-	-	-	-
London and North-Western	2	9	-	-	1	-	1	1	1	-	-	-	28
London and South-Western	-	1	-	-	1	-	-	1	-	-	-	-	1
London, Brighton, and South Coast - - -	-	2†	1	-	1	-	-	1	-	-	-	-	1
London, Chatham, and Dover - - -	1	-	-	-	1	-	-	-	-	-	-	-	3
Macclesfield Committee -	-	-	-	-	1	-	-	-	-	-	-	-	-
Manchester, Sheffield, and Lincolnshire - -	-	-	-	-	-	-	-	-	-	-	-	-	5
Manchester, South Junction, and Altrincham - -	-	-	-	-	1	-	-	-	-	-	-	-	-
Maryport and Carlisle -	-	-	-	-	-	-	-	-	-	-	-	-	1
Metropolitan - - -	-	1	-	-	-	-	-	-	-	-	-	-	-
Metropolitan District -	-	-	-	-	-	-	-	-	-	-	-	-	-
Midland - - -	1	-	-	-	1	-	-	-	-	-	-	1	7
Monmouthshire - - -	-	-	1	-	-	-	-	-	16	1	-	-	-
North-Eastern - - -	1	1	-	-	-	-	-	-	20	-	-	-	8
North London - - -	1	-	-	-	-	-	-	-	-	-	-	-	1
North Staffordshire -	-	-	-	-	-	-	-	-	-	-	-	-	12
North Union - - -	1	-	-	-	-	-	-	-	-	-	-	-	-
Potteries, Shrewsbury, and North Wales - -	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhymney - - -	-	1	1	-	-	-	-	-	-	-	-	-	-
Severn and Wye Railway and Canal - - -	-	-	-	-	-	-	-	-	1	-	-	-	-
South-Eastern - - -	-	8	-	-	1	-	-	1	-	-	-	-	1
Private Owners - - -	-	-	-	-	-	-	-	-	-	-	-	-	422
TOTAL ENGLAND AND WALES - - }	11	25	9	-	16	2	3	7	54	26	-	4	559

* See note to Table 1.

† 34 passengers and five servants were injured in a collision between a passenger train and a pilot-engine, both belonging to the South-Eastern

TABLE No. 4.

during the Six Months ending 30th June 1879, distinguishing the different CLASSES of ACCIDENTS, the different RAILWAYS
 Servants of Railway Companies, KILLED or INJURED on each Railway by those Accidents.

The failure of wheels.	The failure of axles.	The failure of break apparatus.	The failure of couplings.	The failure of ropes used in working inclines.	The failure of tunnels, bridges, viaducts, or culverts.	Broken rails.	The flooding of portions of permanent way.	Slips in cuttings or embankments.	Fire in trains.	Fire at stations or involving injury to bridges or viaducts.	Other accidents.	Number of Passengers and others.		Number of Servants.		Total all Classes.	
												Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	7	-	-	-	-	-	-	-	2	-	2	2
1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
-	4	-	-	-	-	38	-	4	-	-	-	1*	13	-	1	1	14
-	7	-	-	-	-	10	-	-	-	-	-	-	7	-	-	-	7
6	20	-	-	-	-	18	1	1	1	-	-	-	12	-	4	-	16
-	6	-	1	-	-	77	-	-	-	-	-	-	13	-	-	-	13
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
-	4	-	-	-	-	-	-	-	-	-	-	-	61	-	3	-	64
-	4	-	-	-	-	14	-	-	-	-	-	-	4	-	-	-	4
-	7	-	-	-	-	21	-	-	-	-	-	-	51†	-	7†	-	58
-	2	-	1	-	-	29	-	-	-	-	-	-	7	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
-	4	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	2	-	8
-	-	-	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-
-	14	-	-	-	-	28	-	-	-	-	-	-	-	-	1	-	1
-	1	-	-	1	-	-	-	1	-	-	-	-	-	-	2	-	2
-	35	-	-	1	-	16	-	-	-	-	-	-	3	-	2	-	5
-	1	-	-	-	-	8	-	-	-	-	-	-	1	-	1	-	2
-	9	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	-	-	-	-	-	-	20	-	1	-	21
7	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	161	-	2	2	-	272	1	6	1	-	1	1*	202	-	30	1	232

TABLE No. 4.—Number of Accidents to Trains,

NAME OF COMPANY.	Col- lisions between pas- senger trains or parts of pas- senger trains.	Col- lisions between pas- senger trains, and goods or mineral trains, engines, &c.	Col- lisions between goods trains or parts of goods trains.	Trains coming in contact with pro- jections from other trains travel- ling on parallel lines.	Pas- senger trains or parts of pas- senger trains leaving the rails.	Goods trains or parts of goods trains, &c., leaving the rails.	Trains or engines travel- ling in the wrong direction through points.	Trains running into stations or sidings at too high a speed.	Trains running over cattle or other obstruc- tions on the line.	Trains running through gates at level- cross- ings.	The bursting of boilers or tubes, &c. of engines.	The failure of ma- chinery, springs, &c. of engines.	The failure of tyres.
SCOTLAND.													
Caledonian - - -	-	2	-	-	8	-	-	-	2	2	-	-	29
Dingwall and Skye - -	-	-	-	-	1	-	-	-	-	-	-	-	-
Glasgow and South-Western	-	2	-	-	2	-	1	-	3	-	-	-	6
Glasgow, Barrhead, and Kilmarnock Joint -	-	-	-	-	-	-	-	-	-	-	-	-	-
Glasgow, Bothwell, Hamil- ton, and Coatbridge -	-	-	-	-	-	1	-	-	-	-	-	-	-
Highland - - -	-	1	-	-	1	-	-	-	-	-	-	-	-
North British - - -	-	6	2	-	2	-	-	-	3	-	-	-	4
Sutherland and Caithness -	-	-	-	-	1	-	-	-	-	-	-	-	-
Wigtownshire - - -	-	-	-	-	-	-	-	-	-	-	-	1	-
Private Owners - - -	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL SCOTLAND -	-	11	2	-	15	1	1	-	8	2	-	1	39
IRELAND.													
Ballymena, Cushendall, and Red Bay - - -	-	-	-	-	-	-	-	-	-	-	-	-	1
Belfast and Northern Coun- ties - - -	-	-	-	-	-	-	-	-	-	-	-	-	3
Great Northern of Ireland -	-	-	-	-	1	-	-	-	-	-	-	-	-
Great Southern and Western	-	1	-	-	-	-	-	-	-	-	-	-	-
Midland Great Western -	-	-	-	-	1	-	-	-	-	-	-	-	1
Waterford and Central Ire- land - - -	-	1	-	-	-	-	-	-	-	-	-	-	-
Waterford and Limerick -	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL IRELAND -	-	2	-	-	2	-	-	-	-	-	-	-	5
TOTAL UNITED KINGDOM	11	38	11	-	33	3	2	7	62	28	-	5	603

Rolling Stock, Permanent Way, &c.—*continued.*

The failure of wheels.	The failure of axles.	The failure of break apparatus.	The failure of couplings.	The failure of ropes used in working inclines.	The failure of tunnels, bridges, viaducts, or culverts.	Broken rails.	The flooding of portions of permanent way.	Slips in cuttings or embankments.	Fire in trains.	Fire at stations, or involving injury to bridges or viaducts.	Other accidents.	Number of Passengers and others.		Number of Servants.		Total all Classes	
												Killed.	In-jured.	Killed.	In-jured.	Killed.	In-jured.
-	22	-	-	-	-	130	-	-	-	-	-	-	1	-	5	-	6
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	5	-	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	10	-	-	-	1	873	-	-	-	-	-	-	14	1	8	1	22
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	47	-	1	-	1	1,009	-	-	-	-	-	-	15	1	13	1	28
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	3	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	10
-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	9	-	3	-	-	1	-	-	-	-	-	-	10	-	-	-	10
15	217	-	6	2	1	1,282	1	6	1	-	1	1*	227	1	43	2	270

* See note to Table 1.

TABLE No. 5.

NUMBER of SERVANTS of RAILWAY COMPANIES and CONTRACTORS reported, during the Six Months ending 30th June exclusively upon Railways, distinguishing the Number which have occurred on each Railway or System of Railway,

NAME OF COMPANY.	From accidents to trains, &c. See Table No. 4.		Whilst coupling or uncoupling vehicles.		By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines.		Whilst passing over, or standing upon, buffers during shunting.		When getting on or off, or falling off engines, waggons, &c., during shunting.		Whilst breaking, spragging, or chocking wheels.		Whilst attending to ground-points, marshalling trains, &c.		Whilst moving vehicles by capstans, turn-tables, props, &c., during shunting.		By other accidents during shunting operations, not included in the preceding.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
ENGLAND AND WALES.																		
Brecon and Merthyr Tydfil Junction -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cheshire Lines - - -	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Cornwall - - - -	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Furness - - - -	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Great Eastern - - -	-	1	-	8	-	1	-	2	-	3	-	1	-	4	-	5	-	4
Great Northern - - -	-	-	-	9	-	1	-	2	-	6	-	3	-	1	-	-	-	5
Great Western - - -	-	4	1	21	-	5	-	2	-	21	-	9	-	3	-	3	-	6
Hammersmith and City -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lancashire and Yorkshire - -	-	-	1	10	-	3	-	3	-	9	-	5	1	4	-	7	-	12
London and North-Western - -	-	3	1	16	1	5	-	-	1	14	2	6	1	2	-	21	1	12
London and North-Western and Great Western Joint - - -	-	-	-	2	-	-	-	1	-	2	-	1	-	-	-	-	-	1
London and South-Western - -	-	-	-	1	-	-	-	1	1	3	-	-	1	-	-	-	2	2
London and South-Western and London, Brighton, and South Coast Joint - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
London, Brighton, and South Coast -	-	7*	-	4	-	-	-	1	-	3	-	1	-	-	-	4	1	3
London, Chatham, and Dover -	-	-	1	2	-	-	-	-	-	-	-	1	-	-	-	1	2	-
London, Tilbury, and Southend -	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Macclesfield Committee - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manchester, Sheffield, and Lincolnshire -	-	-	-	3	-	-	-	1	-	4	-	3	-	-	-	-	-	2
Manchester, South Junction, and Altrincham - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maryport and Carlisle - - -	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metropolitan - - - -	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metropolitan and Metropolitan District -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metropolitan and St. John's Wood -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metropolitan District - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Midland - - - -	-	1	1	22	-	1	-	4	1	10	-	4	1	2	-	-	-	7
Monmouthshire - - - -	-	2	-	2	-	-	-	-	-	-	-	1	-	-	-	1	-	1
Northampton and Banbury Junction -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North-Eastern - - - -	-	2	1	12	-	-	-	-	-	5	-	3	-	4	1	2	-	7
North London - - - -	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1	-
North Union - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Preston and Wyre - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhymney - - - -	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* See Note to Table 4.

TABLE No. 5.

1879, as KILLED or INJURED in the UNITED KINGDOM by the TRAVELLING of TRAINS or the MOVEMENT of VEHICLES used and classifying as far as practicable the Nature and Causes of the Accidents occasioning the Death or Injury.

From falling off engines, &c., during the travelling of trains.		By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains.		When getting on or off engines, vans, &c., during the travelling of trains.		Whilst attending to, or by the failure of, machinery, &c., of engines in steam.		Whilst working on the permanent way, sidings, &c.		Whilst attending to gates at level-crossings.		Whilst walking, crossing, or standing on the line on duty.		From being caught between vehicles.		From falling or being caught between trains and platforms, walls, &c.		Whilst walking, &c., on the line on the way home, or to work.		Miscellaneous.		TOTAL.	
Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	1	-	-	1	-	-	-	2	-	1	-	-	-	-	-	-	4	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	1	1	-	-	1	-	1	-	-	-	-	-	-	1	-	4
-	-	1	3	-	1	-	3	3	4	-	1	3	4	2	4	-	1	-	6	-	1	9	57
-	1	-	1	-	-	-	1	1	2	-	-	3	6	-	4	-	1	-	-	-	1	4	44
2	1	1	1	1	1	-	3	4	15	1	-	2	7	2	8	-	3	-	-	-	1	14	114
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
-	-	-	2	1	4	-	8	2	5	-	-	-	4	1	8	1	4	-	-	2	4	9	92
-	-	-	2	1	1	-	6	6	8	-	-	12	14	1	11	4	11	1	-	-	3	32	135
-	-	-	-	-	1	-	-	1	1	-	-	2	-	-	-	1	-	-	-	-	-	4	9
1	-	-	-	-	-	1	-	1	1	-	-	3	-	-	2	1	1	-	-	-	1	11	12
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-
-	-	-	-	-	1	-	-	-	1	-	-	1	2	-	-	-	1	-	-	-	3	2	31*
1	1	-	-	-	1	-	-	1	3	-	-	-	2	-	-	-	1	1	-	-	-	6	12
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	3
-	-	-	-	-	-	-	-	1	2	-	-	1	2	-	1	2	1	-	1	-	1	4	21
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	2	1	-	-	-	1	-	-	-	-	-	-	-	2	4	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	
-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	1	-	1	-	-	-	-	4	4	-	-	9	7	3	7	-	2	-	1	-	1	19	75
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	8
-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1	-	-	2	-	2	-	2	-	2	-	1	2	3	-	1	1	3	-	-	-	1	6	52
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	1	2
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4

TABLE No. 5.—Number of Servants reported

NAME OF COMPANY.	From accidents to trains, &c. See Table No. 4.		Whilst coupling or uncoupling vehicles.		By coming in contact whilst riding on vehicles during shunting with other vehicles, &c. standing on adjacent lines.		Whilst passing over, or standing upon buffers during shunting.		When getting on or off, or falling off, engines, waggons, &c. during shunting.		Whilst breaking, spragging, or chocking wheels.		Whilst attending to ground-points, marshalling trains, &c.		Whilst moving vehicles by capstans, turn-tables, props, &c. during shunting.		By other accidents during shunting operations not included in the preceding.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
ENGLAND AND WALES—cont.																		
Rhymney and Great Western Joint -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ryde and Newport and Cowes and Newport Joint -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Somerset and Dorset -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South-Eastern -	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Taff Vale -	-	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-
West London Extension -	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL, ENGLAND AND WALES -	-	30	6	116	1	18	-	17	5	82	2	39	4	20	1	44	7	63
SCOTLAND.																		
Caledonian -	-	5	1	12	-	1	-	2	3	6	-	2	-	2	-	2	-	3
Dundee (East) Joint Station -	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-
Glasgow and Paisley Joint -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Glasgow and South-Western -	-	-	-	1	-	1	-	-	-	3	-	-	-	-	-	-	-	-
Glasgow, Barrhead, and Kilmarnock Joint -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Highland -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North British -	1	8	1	16	-	2	-	6	3	18	-	4	3	4	1	1	1	9
Sutherland and Caithness -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sutherland's, Duke of -	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL, SCOTLAND -	1	13	3	29	-	4	-	8	6	27	-	7	3	6	1	3	2	14
IRELAND.																		
Ballymena and Larne -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Belfast and Northern Counties -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cork and Bandon -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Great Northern of Ireland -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Great Southern and Western -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Midland Great Western -	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Sligo, Leitrim, and Northern Counties -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waterford and Limerick -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL, IRELAND -	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-
TOTAL, UNITED KINGDOM -	1	43	9	145	1	22	-	25	11	110	2	46	7	26	2	47	10	77

as Killed or Injured, &c.—continued.

From falling off engines, &c., during the travelling of trains.		By coming in contact with over-bridges or erections on the sides of the line, during the travelling of trains.		When getting on or off engines, vans, &c., during the travelling of trains.		Whilst attending to, or by the failure of, machinery, &c., of engines in steam.		Whilst working on the permanent way, sidings, &c.		Whilst attending to gates at level crossings.		Whilst walking, crossing, or standing on the line on duty.		From being caught between vehicles.		From falling or being caught between trains and platforms, walls, &c.		Whilst walking, &c., on the line on the way home or to work.		Miscellaneous.		TOTAL.	
Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	2	3	-
1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
6	5	2	18	4	15	1	23	32	58	1	2	40	56	10	49	11	81	4	11	2	17	139	704
-	2	-	2	-	2	-	1	1	4	-	-	8	4	-	3	-	-	1	1	-	-	14	54
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	1	2	-
-	1	-	-	-	-	-	-	1	1	-	-	2	3	-	1	-	1	-	-	-	3	12	-
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-
-	1	-	1	-	-	-	2	2	3	-	-	2	3	2	1	1	2	1	-	3	18	84	-
-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
-	4	-	3	1	2	-	3	6	8	-	-	12	10	2	7	1	3	2	1	-	3	40	155
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-
-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	1	1	-
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	2	2	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	1	1	-
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	2	-	-
2	1	-	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	4	2	-	-	10	4
8	10	2	16	5	17	1	26	39	61	1	2	53	66	12	56	13	34	10	14	2	20	189	863

TABLE No. 6.

TABLE showing the different OCCUPATIONS of SERVANTS of RAILWAY COMPANIES and CONTRACTORS who were KILLED and INJURED during the Six Months ending 30th June 1879, and classifying their INJURIES as far as practicable.

CLASS OF SERVICE.	Fatal.	Amputations.			Fractures.		Dis-locations.	Crushes.			Scalds.	Sprains, Cuts, or Bruises.	Severe.	Shaken.	Slight.	Unspecified Injuries to				Miscellaneous.	Total Injured.
		Legs or Arms.	Feet or Hands.	Toes or Fingers.	Legs or Arms.	Collar-bones or Ribs.		Legs or Arms.	Feet or Hands.	Body.						Head.	Body.	Legs or Arms.	Feet or Hands.		
Breaksmen and Goods-guards	22	3	1	-	6	3	2	6	31	14	-	72	5	7	4	4	12	10	18	-	198
Capstanmen	-	-	-	1	-	-	-	-	1	2	-	2	-	1	-	1	1	1	2	-	12
Carmen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carriage-cleaners	-	1	-	-	-	1	-	-	-	-	-	-	-	-	2	-	1	-	-	-	5
Carriage or Waggon examiners	2	-	1	-	1	-	-	-	2	-	-	1	1	1	-	2	2	-	-	-	11
Checkers	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chockers, Chain-boys, and Slip-pers	-	-	-	1	1	-	-	-	-	-	-	1	-	-	-	-	1	1	8	-	8
Clerks	4	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	3
Engine-cleaners	-	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	1	-	1	-	6
Engine-drivers	4	3	-	-	2	-	-	1	-	1	3	12	2	4	2	2	6	2	3	-	43
Firemen	9	1	-	-	5	-	-	2	7	-	3	21	6	2	2	8	1	-	4	1	63
Gatekeepers	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	1	-	3
Greasers	-	1	-	-	-	-	-	-	1	-	-	1	-	-	-	2	-	-	-	-	5
Guards, Passenger	3	-	-	-	-	1	-	-	-	1	-	7	1	3	1	2	-	1	-	-	17
Horse-drivers	2	-	-	1	-	-	1	-	5	3	-	6	-	-	-	-	1	1	3	-	21
Inspectors	3	-	-	-	1	-	-	-	-	-	-	1	-	1	-	-	2	1	-	-	6
Labourers	11	2	-	1	2	1	-	2	1	-	-	6	2	-	1	1	-	-	1	-	20
Lampmen	2	-	-	1	-	-	1	-	2	-	-	1	-	2	-	-	-	-	-	-	7
Loaders and Sheeters	-	-	-	-	-	-	-	-	-	1	-	4	-	-	-	-	1	1	-	-	7
Mechanics	9	1	1	-	2	-	-	-	-	1	-	1	-	-	-	2	1	-	1	-	10
Messengers	-	-	-	-	1	-	-	-	1	-	-	2	1	-	-	-	-	-	-	-	5
Number-takers	2	-	-	1	-	-	-	-	-	-	-	5	1	-	-	-	1	-	1	-	9
Permanent - way Men	44	1	1	1	6	2	-	3	3	-	-	29	1	4	3	5	7	8	1	-	75
Pointsmen	5	-	-	-	1	-	-	1	3	-	-	5	-	1	1	-	-	1	-	1	14
Policemen	2	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2
Porters	20	1	1	1	10	4	1	9	24	13	-	36	3	6	4	5	2	7	17	-	144
Shunters	22	4	2	2	4	1	1	8	15	4	-	27	1	1	3	4	7	8	17	-	109
Signal-fitters	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Signalmen	3	1	1	-	1	-	-	-	1	-	-	1	1	1	-	-	2	-	2	-	11
Station Masters	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3
Ticket-collectors	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Watchmen	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	2
Yardsmen	5	-	-	1	1	-	-	1	2	-	-	13	-	-	-	-	3	-	1	-	22
Miscellaneous	6	-	-	1	-	-	-	-	2	-	-	2	2	1	1	-	1	1	-	-	11
Contractors' Servants.	3	-	-	-	-	-	-	-	1	2	-	3	-	1	2	-	-	-	1	-	10
TOTAL	189	19	8	12	46	15	6	34	105	42	6	264	27	37	26	39	54	43	78	2	863

TABLE No. 7.

NUMBER of PERSONS reported during the Six Months ending 30th June 1879, as having been KILLED or INJURED, whilst upon the Companies' Premises, by Accidents in which the Movement of Vehicles used exclusively upon Railways was not concerned, distinguishing between Passengers, Servants of Companies, and other Persons, and classifying, as far as practicable, the Nature and Causes of the Accidents occasioning the Death or Injury.

	ENGLAND AND WALES.		SCOTLAND.		IRELAND.		UNITED KINGDOM.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
PASSENGERS :—								
Whilst ascending or descending steps at stations - - - -	—	43	—	—	—	—	—	43
By being struck by barrows, by falling over packages, &c. on station platforms -	—	14	—	—	—	—	—	14
From falling off platforms - - -	—	11	—	—	—	—	—	11
By other accidents - - - -	1	13	—	1	—	—	1	14
TOTAL - - - -	1	81	—	1	—	—	1	82
SERVANTS :—								
Whilst loading, unloading, or sheeting waggons - - - -	1	184	—	9	—	1	1	194
Whilst moving or carrying goods in warehouses, &c. - - - -	—	65	—	—	—	—	—	65
Whilst working at cranes or capstans -	3	48	—	7	—	1	3	56
By the falling of waggon-doors, lamps, bales of goods, &c. - - - -	2	41	—	3	—	—	2	44
From falling off, or when getting on or off, stationary engines or vehicles -	—	128	—	13	—	—	—	141
From falling off platforms, ladders, scaffolds, &c. - - - -	2	73	—	1	—	—	2	74
By stumbling whilst walking on the line or platforms - - - -	1	55	—	2	—	—	1	57
Whilst attending to stationary engines in sheds - - - -	—	34	—	1	—	—	—	35
By being trampled on or kicked by horses -	—	10	—	1	—	1	—	12
Whilst working on the line or in sidings -	6	108	—	—	—	—	6	108
Miscellaneous - - - -	—	50	—	—	—	—	—	50
TOTAL - - - -	15	796	—	37	—	3	15	836
PERSONS ON BUSINESS AT STATIONS -	3	32	1	2	—	1	4	35
SUMMARY :—								
Passengers - - - -	1	91	—	1	—	—	1	82
Servants - - - -	15	796	—	37	—	3	15	836
Persons on business at stations - -	3	32	1	2	—	1	4	35
TOTAL ALL CLASSES -	19	909	1	40	—	4	20	953

REPORTS TO THE BOARD OF TRADE BY INSPECTING OFFICERS OF THE RAILWAY DEPARTMENT UPON CERTAIN ACCIDENTS WHICH HAVE BEEN INQUIRED INTO.

	Page		Page
CALEDONIAN :		LONDON AND NORTH-WESTERN :	
Major-General Hutchinson's report on an accident that occurred on 23rd April, at Leysmill station, from the axles under the engine breaking - -	23	Colonel Yolland's report on a collision that occurred on 31st May, near Bloomfield junction, between an up express train and a down passenger train -	45
CORNWALL :		LONDON AND SOUTH-WESTERN :	
Colonel Yolland's report on a collision that occurred on 13th June, at Truro, between a cattle train and a goods train : - - - -	24	Colonel Yolland's report on an accident that occurred on 8th and on 26th March, in each case to a passenger in alighting at the Richmond new station from a Metropolitan District passenger train, together with copy of correspondence between the Richmond Vestry and the Board of Trade relative thereto, and between the Board of Trade and the London and South-Western Railway Company relative to their not reporting these and certain other accidents pursuant to the Regulation of Railways Act, 1871 - - -	57
GREAT EASTERN :		LONDON, BRIGHTON, AND SOUTH COAST :	
Major-General Hutchinson's report on a collision that occurred on 29th May, between a passenger train and the buffer stops, at Wells station -	28	Major-General Hutchinson's report on a collision which occurred on 26th May, between a passenger train and the buffer stops, at Brighton station -	65
GREAT SOUTHERN AND WESTERN :		NORTH BRITISH :	
Major-General Hutchinson's report upon a collision that occurred on 23rd April, near Kingsbridge, between a down special race train and a bank engine - - - -	31	Major Marindin's report on a collision which occurred on 8th April, between Cardenden and Thornton junction, between a passenger train and a ballast train - - - -	67
GREAT WESTERN :		Major Marindin's report on a collision which occurred on 17th May, at Whitemyre junction, near Dun- fermline, between a passenger train and an engine and tender - - - -	71
Colonel Yolland's report on a collision that occurred on 9th May, on the Gloucester Branch, near Swindon, between a passenger train and a coal train - - - -	33	Major-General Hutchinson's report on a collision which occurred on 22nd May, between an express passenger train and the buffer stops at Queen Street station, Glasgow - - - -	75
Colonel Yolland's report on a collision that occurred on 18th May, at Somerton station, between a passenger train and a pilot engine - -	35	SOUTH-EASTERN :	
Colonel Yolland's report on a collision that occurred on 31st May, between a passenger train and some trucks in a siding at the eastern end of Southall station - - - -	38	Colonel Yolland's report on a collision that occurred on 24th May, at Tunbridge station, between a shunting engine and a passenger train - -	78
LANCASHIRE AND YORKSHIRE :			
Major Marindin's report on a collision that occurred on 3rd June, near Towneley station, between a pilot engine and an excursion train - -	41		

*For the Reports upon certain other Accidents which have occurred during the
months of January, February, and March, 1879, vide Parliamentary Paper [C.—2313].*

CALEDONIAN RAILWAY.

SIR, Board of Trade (Railway Department),
13, Downing Street, London, S.W., 15th May 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 30th ultimo, the result of my inquiry into the circumstances connected with the accident which occurred on the 23rd ultimo at Leysmill station on the Arbroath and Forfar line of the Caledonian Railway.

In this case, as the 9.55 a.m. passenger train (consisting of engine and tender, five coaches, and a break-van) from Montrose to Dundee was approaching Leysmill station (where it had not to stop) at a speed of about 30 miles an hour, first the leading axle and then the trailing axle of the engine broke; the whole of the vehicles at once left the rails, and the engine stopped in about 130 yards from the spot where there was the first mark of a wheel being off the rails. None of the couplings gave way; all the wheels (except those of the vehicle next the engine, which were off the rails to the right) were off the rails about a foot to the left.

No passengers complained of injury, but the driver and fireman were slightly bruised and shaken.

In the engine the leading and trailing axles were broken off close to the inside of the boss of the wheel, at the right and left ends respectively; the two leading springs were broken, both piston rods bent, the slide blocks broken, the right-hand cylinder (outside) broken. In the tender two buffers and two springs were broken. Three carriages were slightly damaged.

In the permanent way six rails, 252 chairs, and 157 sleepers had to be replaced.

Description.

This accident occurred on a curve (to the left in the direction in which the train was running) of 65 chains radius, and on a slightly falling gradient. The permanent way is in good order.

The engine (No. 710) was an old single engine originally belonging to the Scottish North-Eastern Railway Company, its mileage not being known; it had been last in the shops in January 1878, when a broken driving axle had been replaced, and other slight repairs executed. The leading axle was of wrought iron (no manufacturer's name), stamped 1862; the trailing axle was of Bowling iron without date, age not known; they were both 5 inches diameter at the centre, $5\frac{3}{4}$ inches at the boss, and $5\frac{1}{2}$ inches at the wheel seat, and were fastened to the wheels by two keys.

The weight of the engine when last weighed in January 1878 was as follows:—

	Right.	Left.	Total.
Leading wheels	- 4.15 tons	4.20 tons	8.35 tons
Driving wheels	- 5.15 „	5.15 „	10.30 „
Trailing wheels	- 2.70 „	2.70 „	5.40 „
	<u>12.00</u>	<u>12.05</u>	<u>24.05</u>

Evidence.

1. *James Henderson*, driver 13 years.—I have been driving engine 710 since last October. Nothing had been wrong with it since that time up to the date of the accident. I started from Montrose punctually at 9.55 a.m. with a train consisting of six vehicles, viz., five coaches and one van, the rear coach having a break compartment, and the van (empty) next the engine. I had last stopped at Bridge of Dun and left it about a minute late, having next to stop at Arbroath. Nothing unusual occurred after leaving Bridge of Dun until I was approaching Leysmill station, when the distant-signal was first at danger, but was taken off before I reached it. I was running at about 30 miles an hour with steam on when I felt the engine suddenly drop in front on the right-hand side, and it at once left the

rails, the right wheels getting inside the right-hand rail. I immediately shut off steam, but there was no time to do anything further as the coal came running from the tender on to the foot-plate. The engine came to a stand in about 130 yards, the fireman and myself both remaining on the engine. I was slightly injured, but had not to leave my work. The fireman was a day off duty, but was not much hurt. On getting off I found the leading axle broken at the right end next the boss, the right end resting on the chairs, but both journals still in the axle-boxes, and the axle-boxes between the horn plates. I also found the trailing axle broken at the left end, but not much out of its place, and the journals in the boxes. I could not say when the trailing axle broke, but it was certainly after the lead-

ing one had done so ; all the engine and tender wheels were off the rails to the left, the van next to the engine off to the right, but the other five vehicles all off to the left with the wheels about a foot from the rails. No couplings had given way. I cannot explain how the left wheels got over the left rail, but the road was all more or less destroyed.

2. *William Clark*, fireman nine years.—I agree with the driver's evidence, except as to feeling the engine drop at the right leading end ; my impression being that all the wheels went off the rails together. I was shaken and off duty for one day.

3. *David McNicoll*, guard 21 years.—The train started punctually at 9.55 a.m. from Montrose for Dundee East. It consisted of six vehicles. There was a van next the engine and a break carriage at the rear, in which I was riding. We last stopped at

Bridge of Dun and left it one minute late, having next to stop at Arbroath. There were about 25 passengers in the train from Bridge of Dun. On approaching Leysmill at a speed of 30 to 35 miles an hour I suddenly felt the speed slacken, and the train stopped quickly. My carriage ran off the rails for some distance. I had no time to get my break on. I was not knocked down or hurt. When I got out I found the whole train off the rails. No couplings had given way, all the wheels were off the rails to the left, except those of the front van, which was buffer locked with the tender, and was off to the right. The carriages appeared to have sustained no damage, except that a few panes of glass were broken. There were no complaints of any consequence from passengers. The accident occurred at 10.40 ; we had left Bridge of Dun at 10.23, the distance to Leysmill being $8\frac{1}{2}$ miles. The line was repaired by about 8.45 p.m.

Conclusion.

There appears no reason to doubt but that this accident was caused by the fracture of the leading axle of the engine drawing the train, and that this fracture was the result of a flaw extending over about one fourth of the whole area (24 square inches) of the fractured surface. The flaw, which was close to the inside of the off wheel, could not have been detected without the removal of the wheel from the axle, and there is no record of this having been done during the 17 years which the axle had probably been in use.

The trailing axle which broke, (probably) after the engine had left the rails, at the left end but otherwise similarly to the leading axle, had a flaw extending over about one sixth of the whole area of the fractured surface. The age of this axle is not known, but it most likely more or less agrees with that of the leading axle.

It is certainly not right that the axles of engines, of which the mileage is unknown, should be left unexamined in their crucial points for so long a period as 17 years ; some reasonable limit of time (when that of mileage is not attainable) should not be exceeded for making these examinations.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General R.E.

Printed copies of the above report were sent to the Company on the 7th June.

CORNWALL RAILWAY.

SIR,

Board of Trade, (Railway Department),
13, Downing Street, 26th July 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 16th ultimo, the result of my inquiry into the circumstances connected with the collision that occurred on the 13th ultimo at the Truro station, on the Cornwall Railway, between an up special cattle train from the Cornwall Agricultural Show at Falmouth and a down goods train.

The engine-driver and fireman of the special cattle train were injured in the act of jumping off the engine immediately before the collision took place, but it is hoped not very seriously.

The engine "Stewart" of the special cattle train was greatly damaged. It had the right-hand trailing buffer and both buffers and the front buffer-plank broken ; the smoke-box and smoke-box door were both broken, the leading life guards, front spindle gland studs, and the right-hand back valve spindle were bent ; the cylinder cock gear and both flanges of the blast pipe broken ; the blower and lubricator gear were damaged ; right-hand leading spring-pin bent and spring knocked off it, and the right-hand driving spring hangers were also bent, and the right-hand sand-pipe was bent, and the box slightly damaged ; the right-hand corner of the tank, and the right-hand

pannel of the coal-bunker were broken in, and the right-hand splasher over leading wheel was damaged; the fire ironwork at back of coal bunker right-hand side was bent, and the chimney-top was slightly damaged; four waggons and a break-van belonging to the Great Western Railway Company, which works the line, were smashed up; six other waggons and two fish vans were slightly damaged, and two waggons belonging to the Cornwall Railway Company had some axle-boxes broken. The locking gear of the points at the east end of Truro yard were damaged, point rods bent, and one point rod broken; one check-rail was broken, seven rollers and brackets and one 9-inch wheel were broken.

Description.

The Cornwall Railway is a single line, with passing-places at some of the stations. Truro is one of these stations, where a branch from the main line to Penzance leaves for Falmouth, distant about $11\frac{3}{4}$ miles from Truro. The approach to Truro station from the west is protected by home and distant signals. The up home-signal is placed about 617 yards to the west of the spot at which the collision occurred; the distant-signal is 560 yards farther to the west than the home-signal, and this distant-signal can be seen for a distance of 968 yards, or at a total distance of 1 mile 385 yards from where the collision occurred.

The branch from Falmouth passes through a tunnel, called the Sparnick tunnel, on an incline of 1 in 63·64 rising towards Truro, the length of the tunnel being about 484 yards. This rising incline is succeeded by a short piece of level line 6 chains in length, and then the line descends on a steep gradient of 1 in 66·74 for 1 mile 10 chains, terminating at the eastern end of Penwithers viaduct, 274 yards in length. The line is then level for 23·60 chains, and this is succeeded by a rising gradient of 1 in 264 for 13 chains to the western face of the home or Higher Town tunnel; thence the line descends to the western end of the Truro station for 29·2 chains, on an incline of 1 in 66·4, and thence it is level up to the spot where the collision took place, very near to a signal-box near the western end of Carnedras viaduct.

The special cattle train ran into the 8.20 p.m. down goods train, consisting of 26 trucks and 2 break-vans, which had arrived at Truro station about 2.55 a.m., and which was standing partly on the single line on the Carnedras viaduct and partly on one of the lines in the station yard. The shunters were appointed to attend at the station for doing what shunting was required about 3.15 a.m., but the shunting had not actually commenced when the collision occurred.

The traffic is worked under the following notice to the servants of the Company :

“ The main lines and branches are worked under the block system of telegraph ;
 “ that is to say, no train may be allowed to pass any block signal-station or signal-
 “ box until the previous train has passed within the signals of the next station or
 “ signal-box in advance ; and it must be specially noted that the ‘ all right ’ signal
 “ given at any one station or signal-box only denotes that the line is clear up to the
 “ distant-signal of the next station or signal-box, and not within it. Engine-drivers
 “ must, therefore, always keep their trains under such control as to be able to stop at
 “ each signal.”

Evidence.

William Bailey, fireman five years, and occasionally employed as an engine-driver, states.—I was in charge of an up special cattle train from Falmouth on the morning of the 13th June; it consisted of a tank-engine, three empty trucks, five trucks loaded with cattle, and a break-van, with two breaksmen in it. I left Falmouth at 2.42 a.m. On leaving Sparnick tunnel I shut off the steam as usual, and very shortly afterwards told the fireman to put on the break. He did so, but the rails being very slippery the wheels skidded, he accordingly let it off again and got a fresh hold : I at the same time worked the sand-box lever, but I did not see any sand issuing from the pipes, and the wheels caught up again when arriving at the ticket platform. I began to blow the break whistle on entering Penwithers viaduct, where the first view of the distant-signal (which I saw was against me) was obtainable, and I continued to do so until immediately on coming into collision, blowing at the same time a shrill whistle for the signal to be lowered. I told my fireman to take off the break again when I found the wheels caught up again at the ticket

platform, and he took them off and applied it again. I have been told to take off the break when the wheels have skidded by the locomotive foreman, and when Mr. Wright was locomotive superintendent he gave instructions to this effect. I did not look back, and so cannot say whether the other breaks were down on the train or not, but owing to the wheels skidding, as they did for a quarter of a mile in the first instance, the weight of the train increased the speed. On opening the valve of the sand-box I looked on both sides of the engine, but could not see any sand running through the pipes; there was plenty of sand in the boxes, and therefore I suppose the pipes were choked. The sand was dry. I did my utmost to pull up at the distant-signal. The speed I was running at was not greater than usual, about 18 or 20 miles an hour, until coming into the home tunnel, when the train made away through skidding so badly. On reaching the ticket platform, and seeing the 8.20 p.m. train across the road, I reversed the engine and gave her steam, but it was of no avail to stop her. I came on duty at 6.30 in the morning of the previous day.

I was then employed as a fireman for a passenger train on the branch line to and from Falmouth, and I continued to act as fireman until 6 o'clock in the evening: I then commenced driving from Truro to Falmouth with cattle trains, and I continued to work through the night up to 3.15 a.m. on the 13th when the collision occurred at Truro station. I think I was running about 20 miles an hour when the collision took place. I was driving the "Stewart" engine, and I had been driving that engine from 6 o'clock on the previous night. I was four or five hours away from the engine while employed as a fireman on the 12th, not consecutively, but now and then. For instance I got to Falmouth at 2.6 p.m., and did not leave until 4.35 p.m.

Temporary Fireman *Charles Wells*, for three or four years, states.—That on leaving Sparnick tunnel (about two miles distant from Truro) with the 2.30 a.m. special cattle train from Falmouth, I applied the break, but the rails being very slippery the wheels skidded, and though my mate worked the sand gear I found the break could not be applied without the wheels catching up. On coming within sight of the distant-signal I saw that it was against us and when I was on the further side of Penwithers viaduct the engine-driver blew the break whistle continuously, but on looking back I did not see any sparks or smoke, nor did the guard by looking out give any sign that he heard the whistle, although Richard West, firing with Causeley on the 8.20 p.m. train, told me he heard it in Truro yard. I and my mate talked over the likelihood of the 8.20 p.m. train being in Truro yard and recognized the necessity of going on carefully, but though our train was not very heavy it was more than we could keep in check with the engine break alone. I took off the break several times because the wheels skidded. I think we were running at 20 miles an hour when we got to the home (or Higher Town tunnel), and at about the same speed when the collision occurred. My mate jumped off the engine at the west end of the station platform; but I remained on the engine. I was hurt in jumping off, and have been off duty ever since. Our engine was thrown off the rails and twisted round to the left. It was a 6-wheeled engine with four wheels coupled. My mate was also hurt in jumping off.

William Curron, signalman in the box at the west end of Truro station, states.—That the special cattle train passed my box at 3.15 a.m. The whistling ceased just before the train reached my box. I judged that it was running at 30 miles an hour. The men on the engine were apparently both attending to their duty. I did not notice the guards. There was no outward appearance of the breaks in the guards van being on. No sparks from the wheels. No men looking out of the window. There were sparks from the engine. A stream of fire from the engine wheels.

Porter *John Ireland* states.—I came on duty at 7 a.m. on the 12th June, and remained on duty until the collision occurred. I did not notice the signal as I passed the box. I was acting guard in charge of the 2.30 a.m. up special cattle train from Falmouth on the 13th June, which consisted of engine, three empty trucks, five trucks of cattle, and one third-class carriage for break. We left Falmouth at 2.47 a.m., and arrived at Truro about 3.15 a.m. There was one break carriage (a third-class) in the train, which was at the rear, and both myself and my mate rode in this vehicle. When passing over the east or Truro end of Penwithers viaduct I looked out of the window and noticed that the train was running fast, and also saw that the Truro distant-signal was on at "danger," and I said to my mate "I will put on the break," and I did so, and I afterwards saw that the home-signal was at "danger." The driver sounded his break whistle when near the distant-signal, between Penwithers junction and the distant-signal,

but I had already begun to apply my break, and I then applied it tightly, and kept it on until the train came into collision with the 8.20 p.m. down goods train from Plymouth. The rails were slippery, and the wheels skidded just inside the distant-signal, and I released the handle a little and put it on again. I only did this once. The shock of the collision was severe. The driver kept sounding his break whistle from the distant-signal until after passing the home-signal but the train ran into Truro station very fast, something like 20 miles an hour. I was standing at my break all the way down from Penwithers junction until we stopped, and the shock of the collision threw me away from the break, and I fell on the seat and my mate was knocked up against me. I was not injured. After the collision I got out of the carriage on the near side, but we had passed the platform. I went up to the engine to see for the driver and fireman, and they were not there. I looked about the trucks that were damaged to see for them, but not finding them I turned back, and I then met them coming towards the train from the station. I asked Driver Bailey if he had any sand, and he replied, "Yes, but the pipes were choked." He also told me that "he had tried to put the sand on several times." The driver was hurt in his shoulder and I took him to the infirmary, and on my way there I told him it was a bad job running through like that, and asked him the cause, and he said "it is all owing to the sand pipes being choked, I should have been able to have pulled up at the ticket platform else." I told the driver that "I put my break on, and that I could do no more," and he said "I did all that I could, I could not do any more." A Mr. Eva, of Camborne, who was riding in the break compartment told me he was not injured at all. He had charge of eight Guernsey cattle, his father's property. I did not inquire of the engine-driver why he did not blow his break whistle sooner. He did not say that he blew his break whistle at Sparnick tunnel, I told him that he had been running fast. I did not hear the break whistle until we were near Penwithers junction. The collision occurred at 3.15 a.m. I believe. I had no watch.

Porter *Tom Lockett* states.—I was acting as "second" guard of the 2.30 a.m. up special cattle train ex Falmouth on 13th June. When passing Penwithers junction Porter Ireland, who was acting as "head" guard, looked out of the window and then went and put on the break, and I then looked out of the window and saw the distant-signal was standing at danger. I saw that both the main line and branch distant signals were standing at danger. I thought the train was travelling rather fast at the time. Porter Ireland was standing with his hand on the break handle, and he had the break on all the way into the station. The wheels skidded once and he eased the handle. I did not notice the home-signal. The driver blew his break whistle just after Ireland looked out of the window and applied his break, and the driver sounded his break whistle continually until we neared the station, and we ran into the station very fast, and came into collision with the 8.20 p.m. goods train ex Plymouth, at the east end of Truro yard. The shock was severe, and I was knocked against Ireland. I was not injured. I got out of the carriage on near side, and went up to the engine to see for driver and fireman, and got upon the step of the engine, but they were not there. I looked under the engine and trucks for them, and on turning around I saw the fireman coming towards the train, and he held his arm as if in pain. I then saw the driver. I asked the fireman "what was the matter," and he said "I believe I have broken my arm." The driver told me that he had hurt his shoulder by jumping off and coming against the metals of the down line. Mr. Eva who rode in the carriage with my mate and myself did not complain of being injured in any way. I did not hear the break whistle until we had reached Penwithers junction. I have not spoken to driver or stoker as to his passing the signals.

James Carlyle, assistant locomotive superintendent, states.—I examined the state of the "Stewart" engine about 8 a.m. on the 13th June, and found that the engine had been reversed, and was in back gear, and the break blocks were in contact with the wheels of the engine, and as far as I knew there was nothing the matter with the engine to prevent it from pulling up. I saw the sand in the boxes and it was perfectly dry, but I did not try the sand pipes.

Copy of a statement from a passenger in the special cattle train handed to me by the Company's district superintendent (Mr. Compton). Troon, 17th June 1879. Samuel Eva, of Troon, age 23, states.—I left Falmouth station on the morning of the 13th instant in charge of my father's cattle. I rode in the break compartment with

the guards. On nearing Penryn station one of the guards put on the break as I understood for one of the porters to get out. I did not have much conversation with the guards after this, and the first thing that came under my notice again was the guard putting on the break some time after we passed Perran station. I heard the loud engine whistle but I believe the guard put on the break before that whistle sounded; after the break was put on the carriage appeared to be jolting and produced an uncomfortable sensation. I did not think of any danger whatever until we were in the station and I saw fire flying. The guards were perfectly sober, and they did not go to sleep on the journey. The guard held on the break until the train stopped, that is from the second time he put it on.

Conclusion.

From the preceding statements it appears that a special cattle train consisting of a tank-engine, three empty, and five trucks loaded with cattle, and a break-van, left Falmouth station in charge of a fireman, acting as an engine-driver and a temporary fireman, for Truro about 2.47 a.m., there being also two guards or breaksmen, and a person in charge of some of the cattle, riding in the break-van at the rear of the train.

When this train had passed through the Sparnick tunnel, which is rather more than two miles from Truro station, the engine-driver states that he shut off the steam as usual, and shortly afterwards told the fireman to put on the break, and he did so, but the rails being very slippery the wheels skidded, and the fireman took off the break and again applied it, and got a fresh hold, while the driver worked the sand-lever, but did not see any sand issuing from the pipes: that he began to sound the break whistle on entering Penwithers viaduct, which is close upon a mile from Truro station: that the wheels caught up again when arriving at the ticket platform (which is about 8 chains inside the up home-signal), and he told the fireman to take off the break again, and he took it off and applied it again: that on reaching the ticket platform, and seeing the 8.20 p.m. train across the road, he reversed the engine and turned on the steam, but it was of no avail to stop the train. The fireman agrees with this statement, and the guards in the break-van assert that the guards break was applied before it was whistled for when near the distant-signal, and taken off and again applied when the wheels skidded.

The driver's statement is that he was running at the usual rate of 18 or 20 miles an hour until coming into the home tunnel, about half a mile from the place where the collision occurred, when the train made away through skidding so badly. The signalman thinks the train was travelling about 30 miles an hour as it passed his box and the driver, fireman, and guard of the train think it was travelling about 20 miles an hour when the collision took place, about 3.15 a.m.

The signalman also states that the men on the engine were apparently both attending to their duty, and the engine break was on as the train passed his box, as there was a stream of fire from the engine wheels, but there was no outward appearance of the break in the guards van being on; no sparks from the wheels and no men looking out of the window.

The most probable explanation that can be supplied as to the cause of this collision is that the men had been too many hours on duty. They had commenced to work at 6.30 a.m. on the previous day, the 12th instant, the acting engine-driver as a fireman with a passenger train up to 6 o'clock in the evening, and when it was time to cease work he commenced driving cattle trains, and continued to work through the night and up to 3.15 a.m. on the 13th instant, when the collision took place. It is quite possible that the driver did not get any assistance towards stopping his train from the guards, and the repeated acts of taking off the breaks when the wheels skidded was not calculated to pull up the train. This is the second case in which this practice is said to have been acted on which has recently come to my notice, and I have no doubt that it allowed the speed to increase in descending the steep inclines while approaching Truro station from the west.

I cannot think that this practice among engine-drivers, firemen, and guards of taking off the breaks because the wheels skidded should be tolerated, especially when the train is in the hands of inexperienced men, such as were in charge of the special cattle train, when descending steep inclines especially close to a passenger station.

Neither should the men have been employed for such a length of time as 21 hours. An important railway company like the Great Western could surely have had no

difficulty in supplying more experienced men for doing the requisite work in connection with this agricultural show without requiring them to work for such long hours.

The Company have, I believe, in this instance had a very narrow escape from a very serious disaster. I understand there were a number of men in some of the vehicles in charge of the cattle, and it is most fortunate that these men escaped without injury from a collision which must have been (judging from the speed at which the cattle train was running, and the extent of the rolling stock damaged), a very severe one.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

GREAT EASTERN RAILWAY.

SIR, Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 21st June 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 31st ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 29th ultimo at Wells station, on the Great Eastern Railway.

In this case the 7.50 p.m. passenger train (consisting of engine, tender, six coaches, and guard's van) from Norwich, due at Wells at 9.45 p.m., came into violent collision with the buffer-stops at Wells station. The buffer-stops were broken up by the force of the collision; the engine then passed through a brick wall, 14 inches thick, of the station building, and stopped with its buffers nearly touching the opposite wall.

One passenger (there were only five in the train) has complained of injury, but a person who had come to the station to meet a passenger expected by the train, and who was either in the water-closet next the platform or in the porters' room beyond it, but probably in the latter, was found dead under the engine some time after the collision.

The engine had its funnel and one of its cylinder cocks knocked off, but the tender, carriages, and van received no damage. After striking the buffer-stops the engine ran a distance of nearly 30 feet, clearing its way through the buffer-stops (snapping in two a wrought-iron tie-bolt $1\frac{1}{2}$ inches in diameter), 10 feet of platform, a 14-inch brick wall separating the water-closets from the platform, and two $4\frac{1}{2}$ -inch party walls.

Description.

Wells is a terminal station at the junction of the single lines from Norwich and Lynn. On the Norwich line the next station to Wells is Walsingham, distant $4\frac{1}{2}$ miles, and for the last two miles of this distance a driver approaching Wells meets with the following gradients:

1,230 yards,	rising	1 in 166
420 yards,	falling	1 in 76
100	"	1 in 440
1,560	"	1 in 85
135	"	1 in 226
75 yards level	(along the platform) to the buffer-stops	

3,520 yards

The spots alluded to in the evidence are:—

Warham crossing,	1 mile 1,010 yards from the buffer-stops.		
Wareham Bridge,	1 mile 100	"	"
Stiffkeys crossing	680	"	"
Ticket platform (Wells end)	225	"	"
Turntable	110	"	"

The engine drawing the train has six wheels, four of which (the driving and trailing wheels) are coupled, weighing 30 tons; the tender has four wheels, with a break-block on each wheel, and weighing (when half full of water and coal) about 13 tons. The break-van weighs about nine tons, and the coaches about 54 tons.

The single line traffic is worked with the train staff, and all arriving trains are ordered to stop at the ticket platform for the collection of tickets.

At the top of the falling gradient of 1 in 76 (1 mile 305 yards from the ticket platform) there is a speed board limiting the speed to 15 miles an hour; if this is attended to, the time occupied in running this distance should take about five minutes; and as 10 minutes is the time allowed for running from Walsingham to the ticket platform, it requires an average speed of 39 miles an hour to run the distance of about $3\frac{1}{4}$ miles from Walsingham to the speed board in the other five minutes.

Evidence.

1. *George Cecil Paynter*, station-master at Wells 16 months, and at Wymondham 17 years previously as station-master.—I was in the room above the porters' room at about 9.45 p.m. on the 29th ultimo. My attention was attracted by a scream from my wife, who was in an adjoining room, and I at once ran down stairs, but before I left the room the engine had run into the porters' room and come to a stand. The first man I saw was Phillips, the driver, who was still on the engine under the cabin. He was quite sober and cool; his hand was on the regulator, whether shut or open I do not know, nor do I know the position of the reversing lever. I said, "What does this mean?" and he said "I don't know." He said he had shut off steam before the usual place. He said his break had been hard on. He made no complaint about his engine or about the guard not having applied his break. I was not aware for an hour and a half after this that any one had been killed. I had been in the porters' room 10 minutes or a quarter of an hour before the accident, when there was no one there. Porter Balls had been in the porters' room when the train whistled, and had seen no one there then; and, so far as I can ascertain, no one had seen the deceased. He was found with one boot laced, and the other unlaced, and it was inferred he had gone into the porters' room to lace his boots. He was a servant of Dr. Foot, and had been sent down to meet some one expected to arrive by the train. After seeing the driver I found the fireman, who said he had jumped off on to the ground just before reaching the platform. He was much alarmed, but did not appear to be injured. He made the same statement as the driver, and could not account for the accident. I then went to the guard. He told me his break was on, but that he could not account for the accident. He was frightened and agitated, but not hurt. All these men appeared perfectly sober. I said nothing to them about speed. I asked porter Hunter whether the breaks were on when the train passed him, and he said they were. The porter, who had been in the porters' room, had been up to the ticket platform to collect the tickets, and he told me that the train passed him about the turntable (110 yards from the buffer-stops). The night was fine and the rails dry. There was no fog. The trains are not telegraphed on to Wells. When I came down to the platform the station clock showed 9.45 p.m., and this was perhaps a minute after the accident. The clock was right by telegraph at 10 a.m. About 14 months since, some empty carriages of an excursion train ran back against the buffer-stops, which were pushed back about three or four notches. They were repaired the same morning, and I believe were in good order at the time of the accident. I remember only one case of a train overrunning the signals a short distance, viz., on Christmas Eve. The rails were very slippery on that occasion. The practice here is to detach the engines from the trains at the ticket platform and let the latter run in by gravity and the use of the guard's van. I have never known of any collision with the buffer-stops in consequence of this mode of working.

2. *John Hunter*, porter two years at Wells, and in charge of the signals on the night of the accident.—The night was fine and the rails dry. I was standing beside the cabin at the Wells end of the ticket platform

when I heard the engine of the train from Norwich give a break whistle,—rather an unusual thing,—and I think I heard it given again. I then noticed, first by sound, and then on seeing the train lights, that the speed was unusually fast, and that the train would not be able to stop at the ticket platform. My distant-signal was off, but the semaphore at "danger"; in fact it is never lowered. I was standing beside the cabin when the train passed me; the speed was 10 or 12 miles an hour, too fast for me to have jumped up on the engine. I saw fire flying from, I think, the engine wheels, but not from the tender wheels or the van-wheels. I did not see fire coming from the funnel of the engine. I did not see what either the driver, fireman, or guard was doing as they passed. I did not see the fireman jump off. I heard the crash of the collision. I did not look at the clock, but I believe the train was punctual. Balls was running towards me when the engine passed. I have known two or three instances in which passenger trains have overrun the signals about 100 yards.

3. *John Balls*, foreman porter at Wells 17 years.—I was in the booking office when I heard the train from Norwich giving the break whistle at about 25 minutes to 10. I went into the porters' room to get my lamp, when I heard a second break whistle, and at once ran to meet the train at the ticket platform. I saw no one about the station when I left it at this time, so that the deceased must have come in after I left. The train passed me when I was near the turntable. Its speed was too fast for me to have jumped on to the engine. I did not see the fireman jump off, but it must have been after the engine had passed that he did so. I saw the fire flying from the tender wheels, but not from the engine wheels. I did not notice the wheels of the guard's van, but the guard shouted to me that his break was on as hard as he could get it. I then turned back; the train had stopped before I got to it. The driver was on his engine. He appeared confused, but not the worse for drink. I was present when the deceased was found. He was on his face between the two cylinders, lengthways, covered with bricks, not wounded or bruised, but quite dead. This was some time (about an hour after the accident). I have never known any previous accident to a loaded passenger train. There were only five passengers in the train. One only complained of being hurt. The train would have been about punctual but for the accident.

4. *William Tuff*, guard seven years.—I left Thorpe station, Norwich, with the 7.50 p.m. train for Wells. We started punctually with seven vehicles, viz., six carriages and a van, in which van I was at the rear of the train. We arrived at Wymondham at right time, and there we attached three vehicles, which we dropped at Fakenham, leaving Fakenham at 9.21, right time. Our next stop was Walsingham, which we reached at 9.32 and left at 9.33, again punctual. We did not overrun the station either at Fakenham or Walsingham. Our time to arrive at Wells ticket platform is about 9.42; the distance from Walsingham to Wells is $4\frac{1}{4}$ miles, the time allowed being about nine minutes. I had last seen the driver at Wymondham. He seemed just as usual. I have known him as long as I can remember, and have travelled this trip once

or twice a day for the last seven years without anything going wrong. I noticed nothing unusual in the speed from Walsingham, and I applied my break just as we reached Warham bridge, (1,860 yards from the station, the usual place,) the speed being then 25 miles an hour as I should judge. I then heard the driver give the break whistle near the Stiffkeys auxiliary signal, about 400 yards from Warham bridge, and I accordingly took another turn at the break-handle and got all the wheels to skid. I saw that they were doing so as I looked out on passing Stiffkeys crossing. I think the speed at this time was somewhat reduced. The speed then diminished very little till we reached the ticket platform, and then it sensibly grew less till we struck the buffer-stops at a speed of about five miles an hour. I stepped on to the far end of the platform just before we stopped, and kept my feet. The van stopped about three or four yards from me and it recoiled about a yard. The breaks remained on up to the collision. I had never slackened them in the least. On the night of the collision the train consisted of two carriages more than usual; the train generally consists of only five vehicles. I have often had the same class of van before, and observed nothing wrong with the breaks at any of the previous stops on this occasion. The night was somewhat hazy. The rails are always a little damp at night. When I looked out at Stiffkeys crossing I saw fire flying from either the engine or tender wheels. I have probably run 2,000 to 3,000 trips from Norwich to Wells, and a large number of these with driver Phillips, and never had any mishap before. I have often run with seven vehicles before, but five is the usual number.

5. *John Phillips*, driver 23 years, and about three years on the Norwich and Wells branch.—I have had my present fireman about 13 months. He is a competent man. I have had the engine which I was driving on the occasion of the accident about four months. The engine was in good order; the break blocks were working properly, and were about two or three weeks old. The engine reversed easily and took steam well. I do not know the weights of the engine and tender. I left Norwich punctually at 7.50 p.m. with a train of seven vehicles to Wymondham, three additional to Fakenham, and then the original seven to Wells; this was two more than usual, five being the ordinary number. Everything went right as far as Walsingham, which we left at right time 9.33, ten minutes being the time usually taken from Walsingham to the ticket platform about $4\frac{1}{2}$ miles. There is a speed board of 15 miles an hour at the top of the bank, but we do not always slow to that speed at it. On the night in question I do not think we ran more than 25 or 26 miles an hour before shutting off steam, which I did at the usual place, viz., Warham crossing, rather more than $1\frac{1}{2}$ miles from the station; but in consequence of the extra weight of the train I had the tender break put on 300 or 400 yards sooner than usual, viz., directly after shutting off steam. After passing Warham bridge I found the speed not diminishing as it ought to do, and in consequence gave the break whistle, but I felt no results. I did not look back to see if the van wheels were

skidding, but again gave the break whistle about 300 yards further on, but still felt no result and did not look back. I then pulled the reversing lever over, and opened the regulator before reaching Stiffkeys crossing; but my steam pressure was only about 30 lbs. at that time, as I was near my journey's end; and at Stiffkeys crossing, 680 yards from the buffer-stops, I got my fireman to help me in putting the reversing lever two notches further back. I first opened the sand-box after passing Warham bridge and kept it open all the way down. No perceptible diminution of speed occurred till we reached the Norwich end of the ticket platform, and then it decreased rapidly till we struck the buffers at a speed which I cannot estimate, as my attention was otherwise taken up. I remained on the engine till it stopped, but the fireman jumped off opposite the turntable. I felt no shock in particular, and I was not hurt. I then shut off steam and put out the fire. I saw nothing of the poor man who was killed. I have no reason to suppose that the guard had not applied his break.

6. *Alfred Robert Collins*, fireman four years, 13 months with driver Phillips.—I have been used to engine No. 129 about four months. The tender break blocks were about three weeks old. The engine was in good order at the time of the accident. We started punctually from Norwich, and from Fakenham the train consisted of seven vehicles, five being the ordinary number. On starting, my mate told me we had two extra vehicles on. Nothing unusual occurred up to Walsingham, which I believe we left at right time. I did not notice anything unusual in the speed up to the time of steam being shut off at Warham crossing, the usual place for doing so, where I do not think the speed exceeded 25 miles an hour. I applied my break soon after at about the usual place, my mate touching me to signify that I should do so. The speed not decreasing as much as usual, the break whistle was given close to Warham bridge, and again between the bridge and Stiffkeys crossing. We felt no noticeable effect, but I did not look back to see if the guard's break was applied. The driver reversed near Stiffkeys crossing and applied steam, and at Stiffkeys crossing he asked me to assist him in pulling the lever further over. There was at this time not more than 30 lbs. of steam in the engine, as we were just about the end of our day's work. The speed did not diminish much till we passed the ticket platform, and then it lessened sensibly. I jumped off near the turntable, feeling sure we should strike the buffers. I stumbled over some obstacle and fell down, but was not hurt, and I was walking forward towards the platform when the engine struck the buffer-stops.

7. *David Davey*, gatekeeper $3\frac{1}{2}$ years at Stiffkeys crossing, a quarter of a mile from the ticket platform.—I saw the Norwich train pass the gates on the evening of the 29th. Its speed was from 15 to 20 miles an hour, faster than usual. Fire was flying both from the wheels of the tender and the guard's van. I noticed that both driver and fireman were pulling at a lever as they passed.

Conclusion.

This collision with buffer-stops was caused by the driver of the train (an experienced man of 23 years service as driver, and of previous good character) having allowed it to attain too great a speed on entering the descending gradients of 1 in 76 and 1 in 85, which prevail for more than a mile in the close approach to Wells station. The train, though not a heavy one (consisting of only six coaches and a break-van), was heavier by two coaches than customary, and this, combined with the facts that the tender was a light one weighing at the time of the collision not more than 13 tons, and that the steam in the engine was nearly exhausted, the day's work being ended, so that reversing was of little avail, made it impossible for the driver to control the speed when he had once allowed it to exceed a proper limit. He had

most probably run up the incline of 1 in 166 at a very fast speed, and not checked this sufficiently soon before entering on the falling gradient of 1 in 76. After discovering his mistake he (and also the fireman) appears to have done what he could to correct it. He certainly stuck to his engine most bravely when it crashed through the buffer-stops and into the station buildings.

There is no reason to suppose that the guard did not do his duty. He states that he had already applied his break before he heard the break-whistle, about where the driver states he first gave it, and that he took in consequence another turn at his break-handle.

The unfortunate man who was killed must have been either in the water-closet or porters' room, probably in the latter, from the position and comparatively uninjured state in which he was found. Had he been in the water-closet he could hardly have escaped without much external injury, as he must in that case have been pushed in front of the engine through a partition wall.

With a view to the prevention of the recurrence of a similar collision, it is most desirable that all trains working down the bank into Wells station should be provided with more break-power than was available on the present occasion, so that in the event of a driver commencing the descent of the bank at too high a speed, he may have it in his power to recover himself. This break-power could best be provided by means of a good continuous break under the driver's control, failing which, a heavier class of engine and tender should be employed, with breaks applied to the wheels of the engine.

It would also, I think, be judicious to allow more time for the distance between Walsingham and Wells. Some of the trains are allowed a minute more than the one in question, but even then an *average* speed of 32 miles an hour, requiring a maximum of 40 miles an hour, must be observed in running from Walsingham to the speed board, if the bank is to be descended at the authorised speed of 15 miles an hour. An allowance of 14 minutes from Walsingham to Wells, which would allow seven minutes for running the $3\frac{1}{4}$ miles from Walsingham to the speed board, or an average of 28 miles an hour, five minutes for the descent of the bank, and two minutes for collecting tickets and entering the station, would not, I submit, be at all too much for all passenger trains.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General, R.E.

Printed copies of the above report were sent to the Company on the 7th July.

GREAT SOUTHERN AND WESTERN RAILWAY OF IRELAND.

Board of Trade, (Railway Department),
13, Downing Street, London, S.W., 16th May 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 28th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 23rd ultimo near Kingsbridge, on the Great Southern and Western Railway of Ireland.

In this case, as the 10.55 a.m. down special race train (consisting of engine and tender and 10 vehicles, including a break-van in front and rear), from Kingsbridge to Sallins was ascending the incline of 1 in 90 leading from Kingsbridge to Inchicore, it was run into at the rear by a pilot engine which was following it to assist it up the incline.

Ten passengers are reported to have been bruised and shaken.

The buffer beam of the pilot engine was broken; the glass of a mirror in a saloon carriage was knocked out and smashed.

No vehicles were thrown off the rails.

Description.

Not far from the down end of the main departure platform at Kingsbridge terminus an ascending gradient of 1 in 90 commences, and extends for some distance towards Inchicore. The line curves to the south as it approaches Island Bridge junction (where the goods and passenger lines unite) about half a mile from Kingsbridge, and the junction main line home-signal is visible only for a short distance (240 yards) before it is reached. The pilot engine was standing in a siding which joins the main line about 270 yards from the down end of the main departure platform, and the collision occurred about 300 yards beyond the siding points.

The station signal-cabin is situated 60 yards on the station side of the siding points.

Evidence.

1. *Daniel Leahy*, driver 11 years.—I was in charge of engine No. 65, 4-wheel coupled express engine and tender, and had on a train consisting of 10 vehicles; the engine and tender were fitted with the vacuum break, but not the train. I started at 10.55 a.m. from the main platform, knowing that I should be assisted up the bank by a pilot engine. The starting-signal was lowered before I started, but the Island Bridge junction distant-signal was at danger, and as soon as I sighted the Island Bridge junction home-signal, 240 yards off, I found it also at danger. I was prepared to stop at it, but just as I sighted it I felt a shove from the pilot engine, and being afraid I should be pushed past the signal I applied the vacuum break applying to the four hind engine wheels and the six tender wheels, and stopped about 100 yards from the home-signal. I did not go more than 20 or 30 yards after feeling the shove. I ascertained afterwards that the reason the signal was at danger was because an engine was on the line between the junction and Inchicore. I was not aware anything had gone wrong, and started again on the signal being lowered; on looking back, however, and seeing the guard motioning me to stop, I did so after having gone forward 20 yards or so. After a few minutes delay the whole train proceeded on its journey, my engine alone pulling the train up the bank without the assistance of the pilot engine. The day was dry.

2. *Isaac Bowley*, guard 12 years.—I was in charge of the special race train on the 23rd, which consisted of 10 vehicles. I was in the rear van. The train was pretty full. We started at 10.55 a.m., and the collision occurred at 10.57. I did not see whether the starting-signal was lowered for us to start. We made a good start, but in consequence of the junction-signals being against us the speed was slackening, and while it was being reduced, and was from three to five miles an hour, but before we had stopped, the pilot engine ran into the train at a speed of about 10 miles an hour. I had seen the pilot engine coming as I thought too fast when 40 or 50 yards off, and I gave the driver

a hand-signal to stop from the left-hand van window. He took the signal, and shut off steam and reversed. I could not see what was done with the break as it was the other side of the engine. When I saw that he would certainly strike us I jumped down on the left-hand side just before the collision. I kept my feet. The train stopped in a very few yards after the collision, and on the home-signal being lowered the driver started ahead, but I stopped him after he had gone about two carriage lengths, wishing to see that the couplings were all correct, and I found a screw coupling unhooked, but no side chains uncoupled. The train then started in about three or four minutes for Sallins. It was principally in the rear of the train that the persons were injured.

3. *Thomas Kavanagh*, driver 12 years.—I was in charge of engine No. 42, a 4-wheeled coupled tender-engine, not yet fitted with the vacuum break. I was standing engine first in the military siding, waiting to assist the special race train up the Inchicore incline. I was standing close to the signal-cabin. Immediately the special train had cleared the siding points they were shifted, and as soon as I saw this was done I started away, the tail of the train being then half-way between the siding points and the junction distant-signal. I did not notice whether this signal was off or on, as my eye was on the tail of the train. I was about 80 yards from the train, running at a speed of 15 to 20 miles an hour, when I saw the speed of the train diminishing. I shut off steam, and told my mate to apply his break, and on coming close up to the train I reversed my engine and put on steam against it. My speed on striking the van was about 12 miles an hour, that of the train being very slow, though it was not exactly stopped. Neither I nor the fireman jumped off, and we were neither of us hurt. The engine rebounded after striking a few feet, and the train shortly stopped. The buffer beam was broken. We gave the train just the one knock. Had I reversed at once I should have avoided the collision, but I was expecting the train driver to go on.

Conclusion.

This collision between a special race train and a pilot engine which was pursuing it to assist it up the Inchicore incline was the natural result of a vicious system of working. Nothing is more certain sooner or later to lead to a collision than the practice in question. In the present case the driver of the passenger train, finding the Island Bridge junction signals against him, began to slacken his speed as he was rounding the curve leading to the junction, and the pilot engine-driver not realizing the extent to which this was being done, and thinking the train would soon again quicken its speed, miscalculated his power of stopping, and struck the tail of the train with a smartish blow instead of gently touching it.

In this case there appeared to have been no absolute necessity for assisting the train up the bank, as the engine of the passenger train was able unassisted to proceed, after the collision, on its journey; but when an assisting engine is necessary its proper place is at the head of the train. If from exceptional circumstances it must be placed

at the tail of the train, the latter should in all cases be brought to rest before being joined by the pilot engine.

The Secretary,
(Railway Department), Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General R.E.

Printed copies of the above report were sent to the Company on the 7th June.

GREAT WESTERN RAILWAY.

Board of Trade, (Railway Department),
13, Downing Street, London, S.W.

SIR,

31st May 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 14th instant, the result of my inquiry into the circumstances which attended the collision that occurred on the 9th instant, between a passenger and a coal train, near Swindon station, on the Gloucester Branch of the Great Western Railway.

Two passengers complained at the time of having been shaken, but nothing further has since been heard of them; and three servants of the Company, viz., the two guards of the passenger train and a messenger lad, are stated to have been slightly injured.

The engines of the two trains had their buffer-planks broken, and the goods train engine and a pair of wheels of a coal truck about the centre of the coal train were knocked off the rails. A goods van and a horse box were slightly damaged, and a coal truck buffer-casting was broken. As regards the permanent way, one rail was broken and two were bent.

Description.

The down branch line trains for Gloucester are started from the south side of the down platform at Swindon; and the down branch line, after passing straight across the up and down main lines between London and Bristol, curves to the right after passing E or the junction signal box, for a short distance, until the next signal-box G comes in sight.

E signal-box is about 338 yards from the point on the down branch line from whence the branch line down trains standing alongside the down platform are started, and G signal-box is 858 yards distant from the same point. The down approach from E to G signal-boxes is protected by down distant and down home signals; the former is 492, and the latter 188 yards south of the centre of G box. There is a through-crossing from the up line to the sidings off the down branch line, and this crossing, as far as the down branch line traffic is concerned, is protected by the down distant and down home signals worked from the G box to which I have referred. The trailing points of the through-crossing on the up line are situated about 45 yards north of the down home signal worked from G box or between it and the box.

The traffic is worked on the absolute block system between E and G signal-boxes, and the following Rule No. 10 has reference to the collision which took place:

"After the 'Line clear' signal has been returned to the station in the rear, the 'line must not be fouled outside the point specified below, until the 'line blocked' signal has been sent to the station in the rear and returned;" and the station in the rear referred to in this rule is stated in the instructions in the G signal-box to be the Swindon E box.

The points and signals at G Box are properly interlocked with each other, so that the points of the cross-over road could not be opened for a train to pass from the up to the down branch line until the whole of the signals referring to the up and down branch lines were set at "danger."

Evidence.

William Stephens, states: I have been a signalman three years, and a policeman one year, and 12 months last August in G box. I came on duty at 7 a.m., and was the switchman at G box, Swindon, on the morning of May 9th. The 10.5 p.m. coal train from Neath to Swindon was signalled to me from Purton

station at 7.4 a.m., and it arrived, at 7.52 a.m. The train had 22 trucks of locomotive coal to put off into the down sidings, and I pulled the points of the cross-over road over for the train to back into the down siding as soon as the train arrived; the train came back, passing from the up main line over the down main line into the down siding. The 7.50 a.m. passenger train from Swindon to Gloucester was signalled to me from G box at 7.55 a.m.; it is due to leave the platform at 7.50. The engine and trucks of the coal train were at that time passing into the down sidings, the engine being between the up and the down main lines. I was waving the goods back into the siding, but owing to the siding being full of trucks they could not get in clear of the down line. I saw the down passenger train coming, with the steam on, and could see that it was coming past my home signal. I put out a red flag, and the driver of the goods train engine blew his break-whistle to call the attention of the driver of the passenger train engine. The passenger train engine came into collision with the goods train engine full front. All my signals were standing at "danger." The collision took place at 7.56 a.m. There is a rule among the regulations which forbids the crossing of a goods train when a passenger train is due, but I did not understand that rule before the collision took place. I waved the red flag against the passenger train when I saw it coming. I did not hear any whistle from the driver of the passenger train for the breaks, but he may have done so. The two engines came in contact with each other; I did not leave the signal-box, and do not know what was thrown off the rails.

G. Chivers, driver of the 10.5 p.m. goods train from Neath to Swindon, with No. 1199 engine, on the 9th May, states, that on arriving at Swindon G box at 7.50 a.m., I stopped to put off traffic into the down locomotive siding. I went ahead over the trailing points, received a signal to come back from the signalman, then crossed over, and after getting back some distance I observed the down passenger train coming out from the station; and seeing that he could not stop, and I being foul of the down main line, I blew my break-whistle. The siding was full with coal trucks, so that I could not get back clear of the down line. The passenger train engine came against my engine and broke the buffer-planks of both engines. Four wheels of my engine were thrown off the rails. I had 31 trucks on, and the trucks had all got clear of the down line when the collision took place. One of the valve spindles of my engine was slightly bent. We were about half an hour late, as we were due at Swindon at 7.20 a.m.

William Ball, an engine-driver, 25 years on the Vale of Neath and Great Western Railways, states: I was the driver of the 7.50 a.m. passenger train from Swindon to Milford on the 9th May. My train consisted of a tender engine, two guards vans, two composite carriages, two third-class carriages, and a horse box, with two guards. One van was at the rear of the train, and the other was in front. The train left the branch platform at 7.50 a.m., the proper time. The starting and junction signals were standing at "all right." I did not notice that the distant and home signals worked from G box on the branch were at "danger," until it was too late to prevent a collision with the 10.5 p.m. Neath coal train engine, which was then foul of the down branch line, at the junction with the locomotive sidings. The distant-signal for G box is not a very good one to see when leaving the branch line platform. I did not see the distant-signal before I passed it; but I saw the down home-signal when I was about midway between the down home and down distant signal, and I was then

running about 15 miles an hour. When I saw the home-signal at "danger" I reversed the engine, blew the break-whistle, and turned on the steam the reverse way, and my mate applied the tender break, and I think I was running 10 or 12 miles an hour when the collision occurred. I was running with the engine in front. My engine was not thrown off the rails, but the leading wheels of the goods train engine were knocked off the rails. I don't know whether any trucks were thrown off the rails. The buffer-plank of my engine was broken. I am not aware that any other damage was done to my engine. I did not hear any complaint from any passenger of injury. The rails were very greasy, which prevented my stopping at the home-signal. I have been in the service 36 years, and I am exceedingly sorry for the mishap, the first I have ever had. I have been driving 25 years.

Noah Harry states: I was fireman of the 7.50 a.m. passenger train from Swindon on the 9th May. I noticed that the starting and junction signals were at "all right," but I did not observe that the distant and home signals worked from G box stood at "danger" until the driver called my attention to them as I was engaged in watering the coal in the tender. I then applied my break when I was about 130 yards from the home-signal, and put down sand, and did all I could to stop the train, but failed to do so before we came into collision with the engine of the 10.5 p.m. Neath coal train at the entrance to the locomotive sidings. I think we were running about 12 miles an hour when the driver called my attention. I cannot tell at what rate we were running when the collision took place. I had jumped off on the left side before it occurred, and the driver followed me. Our engine was not thrown off the rails. Some of the wheels of the goods train engine were thrown off the rails, but I don't know how many. I don't know whether my driver sounded the whistle for the breaks or not. I did not hear any passenger complain of injury.

Robert Martin states: I was head guard of the 7.50 a.m. passenger train from Swindon to New Milford on May 9th. After leaving Swindon station I was sorting my letters, and I felt the train slacken, and I went towards the left side of my van to look out, but before I could do so the collision took place, and I was struck against the break, cutting my head on the right side of my forehead, and injuring my right shoulder. I was riding in the hind van, and did not hear any whistle from the engine; neither the break whistle nor the shrill whistle. I think we were running at from 15 to 20 miles an hour when the collision took place. I returned to my duty last Monday. I did not hear any of the passengers complain of having been injured.

William Walsh states: I was parcel guard of the 7.50 a.m. passenger train from Swindon to New Milford on May 9th. I was standing up in my van, which was next to the engine, sorting my way bills. I felt a slack, and instantly the train came into collision. I was struck against the side of the van, injuring my back. I did not hear any whistle, neither the break nor shrill whistle, sounded from the engine. I think we were running at from 15 to 18 miles an hour when the collision took place. I heard one lady, from Paddington to Cheltenham, third-class, complain that her leg had got a knock; she walked up to the station, but she did not say anything about it afterwards. I saw her just before she went away by train; she asked me if the wheels were all right. A gentleman, first-class, said that he felt a slight shock to his neck, but did not make any further complaint. No one was hurt.

Conclusion.

From the preceding statements it appears that an up coal train from Neath, consisting of an engine and tender and 31 trucks, reached the G signal-box, placed near

the connexion with the locomotive sidings on the Swindon and Gloucester Branch Line, about 7.52 a.m., and stopped there for the purpose of putting part of its load into the siding off the branch down line; and the signalman on duty, at once opened the points of the through-crossing line, for this coal train to be shunted back from the up line, across the down line, into the siding lying west of the down line, and signalled to the driver to set back, and the driver of the train proceeded to back his train along the through-crossing line, but was prevented from getting his engine clear of the down line from the siding being partly occupied by trucks, so that there was not room enough to admit the whole of this coal train in the siding, and the engine of the coal train stood foul of the branch down line.

As the points and signals in the G signal-box are properly interlocked with each other, the signalman could not open the points of the through-crossing line unless the down distant and down home signals both stood at "danger" against any up or down train.

The Company's rule No. 10, to which I have already referred, forbids the line being fouled after the "Line clear" had been returned to the station in the rear (E signal-box) until the "Line blocked" signal has been sent to the station in the rear (E signal-box) and returned; but the signalman on duty (Stephens) had not understood the rule, and had been working under the supposition that the through crossing was protected by the down distant and home signals; and thus the primary cause which led to the collision was the mistake made by the signalman on duty in the G signal-box, in having failed to give the "Line blocked" signal back to the signalman in E box before he opened the points of the through-crossing road, and signalled the driver of the coal train to set back his train for the purpose of placing it in the sidings.

Notwithstanding this mistake in the working of the block system, there need not have been, and there probably would not have been any collision between the passenger train and the coal train if the driver or fireman of the passenger train had either of them been keeping a proper look-out ahead, as the passenger train ran past the down distant and down home signals, both of which had been standing at "danger," and came into collision, engine to engine, 84 yards north or inside of the down home signal, at a speed variously estimated at from 10 to 20 miles an hour.

The engine-driver of the passenger train admitted that he had not observed the down distant signal standing at "danger" against him nor the down home-signal until he was about midway between the down distant and home signals, which are 304 yards apart.

The collision would also, in all probability, have been avoided if the passenger train had been fitted throughout with continuous breaks placed under the control of the engine-driver.

The driver of the passenger train engine, W. Ball, had been an engine-driver 25 years, and he stated that this was the first mishap he had ever had. He is said to be a very good man, and would have been entitled to a premium of 10*l.* next month for good conduct. He has been punished besides by a fine of 2*l.*, and the fireman of the same engine was fined 1*l.*, both being suspended from duty from the 9th to the 15th May. The signalman Stephens was fined 5*s.*

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 17th June.

GREAT WESTERN RAILWAY.

Board of Trade, (Railway Department,)
13, Downing Street, Whitehall, London, S.W.,

SIR,

3rd June 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 21st ultimo, the result of my inquiry into the circumstances connected with the collision that occurred on Sunday the 18th May, between a passenger train and a pilot engine, which was

following the passenger train, at Somerton station, on the Oxford and Birmingham Section of the Great Western Railway.

It is stated that no persons were hurt.

A carriage truck and an empty saloon carriage which were at the tail end of the passenger train were slightly damaged, and the leading buffer-castings of the pilot engine were broken.

Description.

The Company were engaged on the day in question in relaying portions of the down line between Heyford and Aynho stations, which are about five miles apart, with an intermediate station, Somerton, $2\frac{3}{4}$ miles from Heyford; and in consequence of this relaying, all the traffic, up and down, was worked over the up line between Heyford and Aynho as a single line, under the regulations laid down by the Company of providing a pilot-man, and a pilot engine to convey this pilot-man from one end of the single line to the other when required.

Down trains on reaching Heyford station were backed across to the up line, and then proceeded on the wrong road (the up line) to Aynho. There are sidings at Somerton station off the up line which are connected with it by a pair of trailing points, but these become facing points to a down train travelling on the up line, and in consequence the Somerton down distant and home signals were both kept at "danger" to induce the drivers of trains to slacken speed in approaching the station, and these down trains were signalled past by a green flag by day and not by taking off the signals. The traffic is not yet worked on the absolute block system, but orders have been given for its introduction over this portion of line.

There is a level crossing of a public road called Somerton level crossing, which is about 820 yards south from the Somerton station down distant-signal, and the latter is 490 yards south from the down home-signal. The passenger train in front, after passing Somerton level crossing, could be seen from the pilot engine when the latter was passing the down distant-signal, while the engine of the passenger train was standing or passing opposite to the down home-signal.

Evidence.

Robert Parish, engine-driver nearly 21 years, and 30 years altogether in the service of the Great Western Railway Company, states:—I was driving the 11.47 a.m. down passenger train from Oxford to Birmingham on Sunday the 18th instant. My train consisted of a tender engine, six carriages, two break-vans, and a carriage truck with two guards; there were three vehicles (empties) behind the last break-van. We left Oxford about five minutes late, and we stopped at all stations, and when we reached Heyford station we crossed from the down to the up line, and proceeded on the wrong road, the up road, in consequence of some portions of the down road between Heyford and Aynho being relaid. We got orders to travel on the up road from the pilot-man. Passenger trains do not usually stop at Somerton station on Sundays, but as we approached Somerton station I found both the down distant and down home signals on at "danger" against me. It was a fine morning and clear, with sunshine; and the distant or back signal was visible for a long distance. I slackened speed so that I could pull up at the home-signal, but we did not quite stop at it, as we received a signal from the station-master to come forward, and we were running about two miles an hour when the pilot engine ran into us. I sounded the whistle as soon as I came in sight of the signal, and when I saw that the home-signal was not turned off I blew the break whistle. My engine was just level with the home-signal when the pilot engine overtook and ran into us. The carriage truck and an empty saloon carriage were slightly damaged, but they were not thrown off the rails; but the carriage truck being light, was forced under the saloon carriage, and the buffers were interlocked. These two vehicles were uncoupled and left behind at Somerton station, and we proceeded at once. This occurred about 12.30 p.m. The guard made inquiries at Banbury, but could not learn that any

passengers were hurt. I did not feel any blow or shock from the collision.

Thomas Derrick, sub-inspector of traffic, 18 years in the service of the Great Western Railway Company, states: On the 18th instant I was acting as pilot-man for the working of the up and down traffic all on the up road as a single line between Heyford and Aynho, in consequence of portions of the down line being in the act of relaying, and I had a pilot tank engine No. 1020 waiting at Heyford station when the 11.47 a.m. down passenger train reached that station. I gave orders for the passenger train to be crossed to the up line, and for it to proceed towards Aynho on that line, and I followed that train with the pilot engine, leaving Heyford about two minutes after the passenger train. I was riding on the centre of the foot-plate of the pilot engine, which was running with the chimney in front. I was not keeping a look-out ahead. When we had got about a mile this side of Heyford I saw the passenger train about half a mile in front, and I did not see it again until the collision occurred. I heard no whistle from the passenger train engine. The driver was on my right hand and the fireman on my left. Shortly after passing the Somerton level crossing the engine-driver sung out, "Wo," and I being nearer to the break than the fireman, jumped at once to the break, and the fireman followed. I think we were running about seven or eight miles an hour when we passed the Somerton level crossing. I could have got off very easily then, and when the driver called out "Wo" we were going much slower. The steam was off when we passed the Somerton level crossing, and it was not put on again before the collision took place. The rails were slippery, as it had been raining in the morning, but it was not raining then; it was clear. I think I had just got the engine break on, 10 or 20 yards before

we reached the tail of the train. The driver did not whistle, but he reversed his engine just before we came to the tail of the train. I think we were running about four miles an hour when the collision took place. The signals were at "danger"; they had been at "danger" all the morning, and had not been taken off at all. With the pilot engine I had passed once that morning in the same direction, going towards Aynho about half-past 8 o'clock, and on that occasion we were signalled past Somerton station by the station-master with a green flag. This working on the up line had not been going on the previous day. I did not see that we were approaching the tail of the passenger train. I was looking at the men at work on the down line. I gave instructions for the Somerton station signals to be kept at "danger" as the points leading into the siding off the up line became facing-points to a train travelling on the wrong road. I do not think I told the driver of the pilot engine that I had directed the down signals to be kept at "danger," but he was aware of it.

Joseph Newport, engine-driver between two and three years, and about 14 years altogether in the service of the Great Western Railway Company, states : I was driving the pilot engine No. 1020 on the morning of the 18th instant, and was at Heyford station when the 11.47 a.m. down passenger train arrived from Oxford, and saw it crossed over from the down to the up road and proceed onwards towards Aynho ; this was the second trip that morning. We left Heyford station between two and three minutes after the passenger train, and when I passed Somerton level crossing the passenger train was about a quarter of a mile ahead. I think we were running about seven or eight miles an hour when we passed the level crossing, and I could see the Somerton down distant-signal and the tail of the passenger train when I passed the level crossing ; the signal was at "danger." I was working under the instructions of Inspector Derrick to follow the passenger train as quick as possible, so as to avoid delay to up trains ; and from Somerton level crossing I missed the sight of the train ; I could not see it in consequence of a curve in the line. The steam was off as I passed the level crossing, and it was not put on again until I reversed the engine. I could not see the tail of the train when I passed the distant-signal, and I was about 400 or 500 yards from it when I next saw the tail of the train ;

to the best of my knowledge I had not reduced the speed much when I next saw the tail of the train, as I did not think it was stationary ; and when I found that it was stationary I reversed the engine, and the wheel was picked up by applying the steam the reverse way. There was a break on the engine, but the reversal of the engine was a quicker process. We were running between two and four miles an hour when the collision took place. The buffer-castings of my engine were broken, but the engine was not thrown off the rails. The home-signal was at "danger," and I saw it about the same time as I saw the tail of the train. I was not more than 30 or 40 yards from the tail of the train when I thought it was stationary, and then I reversed the engine and applied the steam. I was aware that an up train would be waiting for us at Aynho.

Edward Hermen, station-master at Somerton, states : I was on duty at the station on the morning of the 18th instant. I passed the down Reading goods train on the single line working at 6.34. The down signals were both at "danger." I signalled it forward by a green flag. The next down train was a "special," of empty waggons ; it passed at 7.55 ; the signals stood at "danger," and I signalled it past by a green flag. The pilot engine did not follow either of those trains ; it was standing at Heyford. The next was a passenger train from Oxford, which passed at 9.47 a.m. ; the signals were on at "danger," and it was signalled forward by green flag. The pilot engine did not accompany it. The next was a down goods train, which passed at 9.55 ; the signals were at "danger," signalled forward by green flag, and the pilot engine followed it. The pilot engine returned to Heyford at 11.15. The next down train was a down goods train which passed at 11.25 ; the signals were at "danger." I signalled it forward by green flag, but it was not followed by the pilot engine. The next down train was a passenger train at 12.34. The signals were at "danger," and it was signalled forward with a green flag ; the pilot engine followed, and the collision occurred. There was no difference in the signalling of those trains, and the only difference was that the driver of this train, which was run into by the pilot engine, had pulled up at the home-signal and had just stopped ; in the other cases the drivers had observed my green flag, and had run quietly past the station.

Conclusion.

The Company's regulation for working one of the lines as a single line, in consequence of the other being blocked from an accident or other cause, such as the relaying of a portion of the line between two stations, is as follows :

"A competent person must be appointed as pilot-man who must wear a distinctive badge, which, until the regular badge can be obtained, must be a red flag tied round his left arm ; and no engine must enter upon any portion of the single line without the pilot-man being present and riding upon the said engine, unless two or more trains are required to follow in the same direction, in which case the pilot-man must order all trains to proceed except the last, upon the engine of which he must ride. If a special engine is supplied for the use of the pilot-man he must personally start the whole of the trains, and must follow *or accompany* the last train on the engine provided for his use."

Now, from the preceding statements it will be seen that the 11.47 a.m. down passenger train from Oxford to Birmingham, on the 9th May, was stopped at Heyford station, was backed across to the up line, and then proceeded on the wrong line towards Aynho, and was followed at an interval of two or three minutes by the pilot engine carrying the pilot-man from Heyford so that he might be on the spot to allow of an up train, due at Aynho at 12.25 p.m., to proceed on the up line to Oxford as soon as he reached Aynho.

Intermediate between Heyford and Aynho is Somerton station, where there are sidings off the up line, and connected with it by trailing-points ; and as these points become facing-points to a down train travelling on the wrong road, these signals were

properly kept at "danger," so as to cause the train to travel slowly past the facing-points, after being signalled to do so. This passenger train either actually stopped or nearly stopped,—the evidence differs on this point,—at the Somerton down home-signal, and through the extreme carelessness of the engine-driver of the pilot engine in not keeping a better look-out and maintaining a sufficient distance between the last vehicle in the passenger train and his engine, and not having the latter under proper control, he ran into the rear of the passenger train in broad daylight and on a clear day, and damaged two of the vehicles belonging to it.

The rule which I have recited permits the pilot-man "to follow or accompany" the last train on the engine provided for his use. This rule should be altered, so that when the pilot engine is required to travel over the single line for the purpose of bringing back the pilot-man, it should in all cases be placed in front of and be coupled on to the engine drawing the train.

Collisions of this kind are not unfrequent, and they are the natural result of an objectionable and dangerous mode of working, for which there is no excuse.

I have, &c.,

The Secretary,
(Railway Department,) Board of Trade.

W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 17th June.

GREAT WESTERN RAILWAY.

Board of Trade, (Railway Department,)

13, Downing Street, 3rd July 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 5th ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 31st May, between a passenger train and some trucks standing in a siding at the eastern end of the Southall station, on the Great Western Railway.

Three passengers stated at the time of the collision that they were injured, and four others have subsequently complained that they were either shaken or hurt.

Two empty gunpowder trucks were demolished, and the leading wheels of the passenger train engine were thrown off the rails, one of its buffers was knocked off, a life guard was broken, and the smoke-box of the engine was knocked in.

Description.

There are four lines of way at this part of the Great Western Railway. The two southern lines constitute the down and up lines for the fast passenger traffic, and the two northern lines the down and up lines for the slow passenger and goods traffic; and it frequently happens that passenger trains travelling on the up fast line, on arriving at certain stations, are shunted from the up fast line to the down slow line to admit of an express or fast up train to run by, and then the train which has been shunted is sometimes allowed to resume its journey on the up fast line by which it had reached the station, and at other times, dependent on the nature and the pressure of the traffic on the up fast line, it is directed to proceed on its journey on the up slow line.

Southall is one of these stations where changes of this kind are made, as cross-over roads have been laid in at the eastern and western ends of the station, so that an up train can be shunted from the up fast to the down slow line at either end of the station. The middle platform at Southall station is situated between the up fast and the down slow line. There is also a cross-over road between the down and up slow lines, and means are provided by which a train travelling or standing on the down slow line alongside the middle platform can be shunted across the up slow line into the siding or to the goods shed that lies north of the up slow line and siding, by what is called a compound or pair of slip points on this cross-over road. One lever in the signal-box opens or shuts the points of the cross-over road, in this instance, No. 13, so that when this lever is moved from its normal position the points lie right for a train to cross from the down slow to the up slow line, and if a train is required to

pass from the down slow to the sidings or goods shed north of the up slow line, a second lever, No. 14, has to be moved, which makes the line right for the train to cross the up slow line and to run on to the sidings or into the goods shed beyond them.

When lever No. 13 has been set for a train to cross, it is not possible, from the interlocking of the points and signals, to take off the up starting-signal at the eastern end of the station for an up train to leave by way of the up slow line, so that when a train has been thus shunted at the eastern end of the station from the up fast to the down slow line, and is intended to travel on the up slow line, it is signalled to cross by hand-signal, flag by day, and hand-lamp at night.

At the western end of Southall station a signal is lowered for a train to cross from the down slow to the up slow line, and thence proceed on its way towards London, and no hand-signal is required at the western end of the station to authorise this operation.

Evidence.

William Readings, engine-driver 14 years in the service of the Great Western Railway, states: I was driving the special part of the 3.30 up passenger train from Bristol, running on the narrow gauge line, on the day in question. It consisted of a tender engine, six carriages, and two break-vans, with two guards, one in front, and the other at the rear of the train. It left Swindon at 5.35 p.m., and all went right until we got to Southall at 9.16 p.m. This train was working as a relief train. We were running on the up fast line, and on reaching Southall I was told by the signalman to shunt to the slow line. I asked the signalman where I was to shunt, at the eastern or western end of the station, and he told me to shunt up through the (over) foot-bridge. I drew ahead to get over the points of the cross-over road from the up fast to the down slow line, and then set back and stopped alongside of the platform. I received a "right away" signal from the under-guard at the front of the train, who received it from the guard at the rear of the train by a green light from a hand-lamp, and I also received a word of mouth signal from the signalman of the east signal-box, who was on the platform at the time, standing near the engine. Just at that moment there was a conversation between the two guards of my train respecting the tail lights of my train, and the front guard gave me a red light before I had moved the train; and when they had arranged for the proper tail light on the train, when running on the up slow line instead of on the up fast line, by changing the light from red to green, I was shown a green light to proceed. I started at once, and the signalman was still there when I started. I did not find out that anything was wrong until I struck the truck, when I might be running about 20 miles an hour. I was running at the time with the steam on. The leading wheels of my engine (a six-wheeled single engine) were thrown off the rails, but nothing else in my train was thrown off the rails; one of the buffers of my engine was knocked off, one life-guard was broken, the smoke-box was knocked in, but none of the carriages in my train were damaged. There were about 13 loaded trucks of coal and two empty gunpowder trucks, into which my engine ran, standing on the siding on which I was running when the collision occurred; the empty gunpowder trucks were separated from but stood close to the coal trucks; the empty gunpowder trucks were demolished. I found that instead of having been turned, as I should have been, on to the up slow road, I was permitted to continue running on the through crossing line from the down slow to the sidings and goods shed until my engine reached the siding, and I was not aware until the collision occurred that I was running on the wrong line. Neither I nor my mate were injured. It was clear at the time. I was looking out for the advanced signal, which was showing a white light. I have

been crossed over from the up fast to the up slow line at the same place once before,—about 10 months since.

Herbert Pitson, signalman nearly six years, and eight months in the Southall east signal-box, says: I was the signalman on duty at the east cabin, Southall. The first part of the 3.30 p.m. train from Bristol (which was a narrow gauge train) was called at 9.11, and arrived at 9.17 p.m. on the up fast line. I sent Bonnett, the assistant locking-gear man, who was then in the cabin, to see Mr. Hill, the station-master, and to ask him what I was to do with the train. Bonnett came back and said I was to shunt it on to the slow line for the second part of the 6.0 p.m. train from Oxford to pass. I then told the engine-man of N.G. engine, No. 1124, to go ahead over the points, telling him about the distance he should have to go; and when the train was over the fast main line points I pulled the points over and signalled to the engineman to come back. I was in the signal-box at this time. When the train had got back over the down slow line points, I pulled them over; and at the time hearing something said about no green lamps by Mr. Hill, and as the second part of the 3.30 p.m. train from Bristol was running close behind the second part of the 6.0 p.m. train from Oxford (which was then called up), I went out of my cabin for the purpose of speaking to Mr. Hill about the second part of the 3.30 p.m. train from Bristol being close behind the Oxford train, and to ask about the train I had shunted going via the fast line, and Bonnett, the locking-gear man, told me that Mr. Hill had said the train was to be shunted to the slow line. He also said, "You have not got the cross-over points pulled over;" at the same time saying, "Shall I pull them over for you." I replied, "Yes, pull them over." I saw him pull over No. 13, and as he did so I left the cabin, and went out on to the platform, and there gave the engineman "right away" signal, and Bonnett pulled over No. 14 after I had left the cabin. The person Bonnett refers to, that he heard me speaking to out of the window, was Mr. Hill, the station-master, about the green lamps. I deny that Bonnett came back and said Mr. Hill's instructions were to shunt the train in question on to the down slow line, and let it follow away the 6.0 p.m. ex. Oxford train on fast line. I distinctly understood that I was to shunt the train for the purpose of letting it go up the slow line, and my only reason for going out of my cabin was because I heard something said about there not being any green lamps. Had it not been for that, I should have attended to the working of the points myself. I was authorised to leave my cabin to go to any place where I could hear my bells; and I went from the cabin that I might tell the driver of the 3.30 p.m. train that he might leave, as the starting-signal was on against him; that up starting-signal could not be taken off when

the points of the through crossing road were open. I was not authorised to tell Bonnett to pull over the points in my signal-box.

Frederick Bonnett says : I am assistant locking-gear man at Southall. On Saturday, May 31st, 1879, I received instructions from Mr. Hill, station-master, to be on duty during the evening in case of accident or failure of signals. I was in the east signal-cabin when the first part of the 3.30 p.m. train from Bristol was signalled up at about, I should think, 9.20 p.m., and the train arrived and stopped on the up main fast line at the platform. The signalman "Pitson" asked me to go to the station-master and inquire of him what he was to do with the train, as a fast train was called up. I went and saw the station-master, who instructed me to go back and tell the signalman to shunt it to the down slow line until the fast train had passed, and then to let it follow up the fast line. I returned to the signal-cabin and delivered the message to the signalman, and after the fast train had passed, signalman Pitson was standing at the cabin window, speaking to some one on the platform. When he turned round and asked me to pull over the points, but did not say what points, I expected he meant the slow line cross-over points. He then went out of the cabin and gave the engineman "right away" without any green lights being put on the train. As the Brentford engine was whistling, and a train was called down on slow line, I was much confused and did not know what I was doing. I shifted the points moved by levers 13 and 14.

Henry Hill, station-master at Southall about six months, states : I was on duty on the 31st May. The first part of the stopping train from Bristol arrived—I forget the exact time—after 9 o'clock, and the 6.0 p.m. up fast train, which is not appointed to stop at Southall, had been telegraphed forward, and was called up after the Bristol train had arrived, travelling also on the up fast line. I gave instructions to signalman Pitson to shunt the Bristol train on to the down slow line, and then for it to follow the 6.0 up Oxford train on the up fast line. I did not give those instructions personally to the signalman, but I think I told Bonnett. I believe it was Bonnett who came with a message. On finding that the second part of the Bristol train was close behind, I called out to Pitson, who was then in the signal-box and I was on the east end of the middle platform, to send the first part of the Bristol train up the slow line. He was in his box at that time. As soon as I had told him this he signalled to me that he understood what he was to do. The Bristol train had by this time been shunted on to the down slow line and was standing there. I then went back along the platform to see that the passengers were in the train, and told the guards that they were to start away as soon as they got the signal from the box. That signal should have been given by a hand-lamp showing a white light. That is the practice which has been adopted. They cannot pull off the starting-signal when the points are open for the through crossing road. There was no necessity for the signalman to have left his box for the purpose of starting the train.

Conclusion.

From the preceding statements it appears that the first or South Wales portion of the 3.30 p.m. up passenger train from Bristol was sent forward as a special train. It consisted of an engine and tender, six carriages, and two break-vans, and it reached Southall station all right, about 9.16 p.m., having travelled on the up fast line. The signalman on duty in the signal-box at the eastern end of the station sent Bonnett, an assistant locking-gear man, who was in the signal-box, to ask the station-master (Mr. Hill) what he was to do with this train, and he states that when Bonnett came back from Mr. Hill he told him that he was to shunt it on to the slow line for the second part of the 6.0 p.m. train from Oxford to pass. Bonnett's statement differs from that of the signalman, and he says that the station-master told him to tell the signalman that he was to shunt the train to the down slow line until the fast train had passed, and then to let it follow up the fast train, and that he gave that message to the signalman; and the station-master confirms this man's statement as to the message which he sent to the signalman.

The 3.30 p.m. up train stopped nearly opposite to the signal-box at the eastern end of Southall station on the south side of the middle platform, and when it had stopped, the signalman told the driver that he was to shunt his train from the up fast to the down slow line by the cross-over road at the eastern end of the station, in order that the second part of the 6.0 p.m. up passenger train from Oxford, which is not appointed to stop at Southall, and which was travelling on the up fast line, and had been signalled forward to Southall station, might be allowed to run through the station without being stopped. The driver of the 3.30 p.m. up train from Bristol did as he was directed, drew ahead over the points of the cross-over road, and then backed his train along it until he had placed it on the down slow line, with the engine at the eastern end of the train, clear of the points of the cross-over and through crossing road that leads to the up slow line or to the sidings and goods shed beyond it, and waited for further orders.

It further appears that after the driver of the 3.30 p.m. up train from Bristol had received a signal from the guard at the front of the train, he was stopped, before he started, by the exhibition of a red light.

The signalman was in his signal-box when he gave the driver instructions to shunt back to the down slow line, and he states : " that when the driver had placed the train " on the down slow line, on hearing something said about no green lamps by " Mr. Hill, and as the second part of the 3.30 p.m. train from Bristol was running " close behind the second part of the 6.0 p.m. train from Oxford (which was then

" called up), he went out of his cabin for the purpose of speaking to Mr. Hill about the second part of the 3.30 p.m. train from Bristol being close behind the Oxford train, and to ask about the train he had shunted (the first part of the 3.30 p.m. train) going via the fast line, and Bonnett, the locking-gear man, said, 'You have not got the cross-over points pulled over;' at the same time saying, 'Shall I pull them over for you;' he replied, 'Yes, pull them over'; that he saw him pull over No. 13, and as he did so he left his cabin and went out on to the platform, and then gave the engineman 'right away' signal, and Bonnett pulled over No. 14 after he had left the cabin." His only reason for going out of the cabin was "because he heard something said about there not being any green lamps." He also informed me "that he was authorised to leave his cabin to go to any place where he could hear his bells, and he went from the cabin that he might tell the driver of the 3.30 p.m. train that he might leave, as the starting-signal was on against him;" but he admits "that he was not authorised to tell Bonnett to pull over the points in his signal-box."

The red light that was shown to and prevented the driver of the 3.30 p.m. up Bristol train from leaving the station was given to enable the tail lights on the train to be changed from green to red, as a distinction is properly made by which trains travelling on the up fast line carry red tail lights, while those on the up slow line exhibit green tail lights.

As soon as this change was made, the driver again received a hand-signal and was told verbally to proceed, and he left the north side of the middle platform by the cross-over and through crossing road, passed across the up slow line on to the siding beyond it, without being aware that he was travelling on the wrong line, and he was running at the estimated speed of 20 miles an hour when he ran into the empty gunpowder trucks, which were standing in the siding, on the western side of the loaded coal trucks. The collision was the first intimation which he received that he was not running on the proper up slow line, and it is most fortunate that under such circumstances more passengers were not very seriously injured. The collision took place about 248 yards from where the engine started to cross to the up slow line.

The collision was undoubtedly caused by the act of Bonnett, the locking-gear man in having shifted lever No. 14 in addition to No. 13, which would have set the cross-over road right for the up slow line. But the signalman on duty, Pitson, is the person principally to blame for having caused this collision, in having left his signal-box, and in having directed Bonnett, the locking-gear man, to move the lever of the cross-over road, which he should himself have attended to, and had he done so it is probable that no mistake of turning the train on to the wrong road would have been made.

It also appears to me that Mr. Hill, the station-master, was to blame for not having himself gone to the signal-box to tell the signalman what he was to do with the first part of the 3.30 p.m. up train from Bristol, instead of sending a message by Bonnett, the locking-gear man.

The collision would not in all probability have occurred if there had been a distinct signal placed under the up starting-signal, and locking the slip points right for the cross-over road when this signal had been taken off for an up train to leave the down slow road in order to travel on the up slow road. It is not usual to supply such a signal, but if the operation of transferring an up train from the up fast to the up slow road is likely to occur frequently it would be desirable to supply this signal.

I have, &c.,

The Secretary,
(Railway Department,) Board of Trade.

W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 14th July.

LANCASHIRE AND YORKSHIRE RAILWAY.

Board of Trade, (Railway Department,)
17th June 1879.

SIR,

In compliance with the instructions contained in the Order of the 4th instant, I have the honour to report, for the information of the Board of Trade, the result

of my inquiry into the circumstances attending the collision which occurred on the 3rd instant, near Towneley station, on the Burnley branch of the Lancashire and Yorkshire Railway.

In this case, the 7.15 p.m. excursion train from Windermere to Wakefield (consisting of engine and tender, front break-van, one second-class, one first-class, nine third-class, one first-class, and one second-class carriages, and rear break-van) having been stopped by signal at Towneley station, was standing with the engine at the up starting-signal, and the tail of the train about 25 yards outside the up home-signal, when it was run into from behind, at 1.42 a.m., by the Burnley branch pilot engine, which had followed it from Burnley in order to assist it up the incline.

Nine passengers are reported to have been injured

The front wheels of the rear break-van were knocked off the rails, and the under-frames of this vehicle and of the second-class carriage next in front of it were damaged. Some windows in the van and a buffer-spindle were broken. The permanent-way was not damaged.

Description.

The Burnley branch rises from Burnley station towards the east, for nearly a mile on a gradient of 1 in 69, and then on a gradient of 1 in 193, Towneley station being situated on the steeper gradient, 1,250 yards east of Burnley station. This up distant signal for Towneley is 800 yards, and the up home 150 yards west of the signal-cabin, which is at the east end of the platform.

The former is visible from an approaching train for about 100 yards, and the latter for about 240 yards. The up starting-signal is near the signal-cabin.

Between Burnley station and Towneley station are two signal-cabins, Burnley west and Burnley east cabins, distant from it 800 and 1,100 yards respectively.

At the point of collision, 25 yards outside Towneley up home-signal, the line is on an easy curve to the right, with a steep bank about 30 feet deep on the left-hand side.

The excursion train was fitted with Fay's break in two sections, five carriages being connected with each break-van, and the remainder being loose.

The pilot engine was a tender engine with the ordinary breaks on the six tender wheels, one block on each wheel.

Rule No. 120a, in the Company's Book of Regulations, has reference to banking engines on inclines, and forbids the practice of banking up from behind except under special circumstances, but it has been superseded by the following regulation, which was issued by letter to the different district superintendents in the autumn of 1878, and which has, since this accident occurred, been printed and generally circulated.

ASSISTANT ENGINES ON INCLINES.

Referring to Rule 120a.—Banking engines assisting passenger trains must be attached in front of the trains, the train being brought to a stand at the foot of the incline for that purpose.

The trains must also be brought to a stand at the summit for the banking engines to detach.

The only exception to this rule as regards passenger trains, must be when loose vehicles are attached in the rear of the trains, and in the case of heavy excursion trains, when there is not sufficient break power in the rear of the train to hold it in the event of a break away, then the banking engine must be in the rear, the train being brought to a stand at the foot of the incline, for the engine to get behind it.

Banking engines assisting cattle, goods, or mineral trains, must in all cases be in the rear of the train.

Evidence.

1. *B. Heaton*, signalman one year, states: I came on duty at Burnley west box at 6 p.m. on the 2nd instant for a twelve hours shift. A goods train was given "on line" to me at 1.32 a.m. from Gannow junction, and passed my cabin at 1.34 a.m. It was assisted by a pilot engine. I got "line clear" for it from Burnley east cabin at 1.34 a.m., "be ready" for excursion passenger train at 1.36, "on line" at 1.37,

and this train passed at 1.40. The pilot followed at once from the carriage siding, and I booked it as passing at 1.40. The excursion train passed me slowly, and the pilot followed immediately behind. I got clear for both from the east cabin at 1.40. I did not hear the driver of the excursion train whistle for the pilot, but I thought he wanted it, and therefore let it out. Drivers generally crow for the pilot.

The excursion passed me at about 12 to 15 miles an hour. My clock was correct, and I do not book fractions of a minute.

2. *Ernest Hall*, 19 months signalman, states: I came on duty at Burnley east cabin at 5.15 p.m. on the 2nd instant for a twelve hours shift. I received "be ready" for a goods train at 1.30 a.m., "on line" at 1.34, it passed at 1.35, and I got "line clear" from Towneley at 1.37. I received the "be ready" for passenger train at 1.37., "on line" at 1.40, and it passed at 1.40. The pilot passed nearly a minute later. At about 2.10 a.m. the guard of the excursion train came to me and stated that his train had been run into by the pilot engine. The night man was sent at once to inform the station-master. The excursion was running at from 12 to 15 miles an hour when it passed my box. The pilot was just rung "on line" to me from the west cabin when the tail of the excursion train was passing me. I noticed that the tail and side lamps of the train were burning very brightly. Daylight was just breaking at the time. My clock was right. I think that on former occasions on the same day the pilot was not so far behind trains. This train was running slower than some others which had been banked up on the previous day.

3. *Frederick Matthew*, signalman four months, three years in the service of the Company, states: I came on duty in Towneley west cabin at 6 p.m. on the 2nd instant for 12 hours. I got the "be ready" for a goods train on the up line at 1.32 a.m., "on line" at 1.35, it passed at 1.37, and "line clear" was given at 1.44. I got the "be ready" for the excursion train at 1.39, "on line" at 1.41, and it arrived at my cabin at 1.42. As soon as I had got "line clear" from the cabin in advance at 1.44, I pulled off my up starting-signal for the excursion train to proceed, but it did not move away. Ultimately the guard came to me and said, "The banking pilot has run into us and my van is off the road." I at once blocked the down main-line. I received "on line" for the banking pilot at 1.41, behind the passenger train. I had lowered the up home-signal for the excursion train to come on up to my up starting-signal, but I put it to "danger" directly I saw that the engine of this train had passed it, and it was at "danger" when the collision occurred.

4. *Richard Thomas*, passenger-driver eight years, states: I took a special excursion train from Wakefield to Preston on the morning of the 2nd instant. We left Wakefield at 5 a.m., and I handed it over to the London and North-western Railway Company at Preston at 7.35 a.m., six minutes late. The train was handed back to me in the evening one hour and ten minutes late, and we left Preston at 10.35 p.m. Owing to delays from other trains, we lost another hour and 35 minutes up to Blackburn, and when the collision occurred we were nearly three hours late. I passed Burnley at, I should think, about 20 miles an hour, but I cannot say exactly. The signals were all off for me. On passing Burnley I noticed that the up distant-signal for Towneley was on, but on coming in sight of the home-signal I saw it was off. The up starting-signal was at "danger" and I drew gently forward and stopped at this signal. I had been standing about a minute when I was run into by the pilot engine. On passing through Burnley I did not whistle for the pilot engine, but saw it in the siding at the usual place. I did not know it was following us until it ran into us. I assumed that he would come, although I did not whistle, but I did not know whether or not he had done so. When we have had a very heavy train we have slackened for the pilot, but in this case we did not do so. It was a fine, clear night, with little or no wind. The pilot generally catches us up about the east cabin. I was not running away any faster than usual. I did not stop very

suddenly, but made an ordinary station stop. I think the guard's breaks were applied, but I did not whistle for them. I have worked on this bank for years, but have never had an accident of the sort before. The collision sent the train forward on to my engine, and threw me off my balance. Steam was blowing off on my engine, but I don't think it obscured the signals. I know Rule 120a, but it had been allowed to lapse in most cases. The new rule had not been communicated to me before the accident. I had been standing nearly a minute before we were run into.

5. *Richard Garlick*, fireman five years, states: On the 2nd instant I was fireman to Richard Thomas. On passing through Burnley the signals were all off, but on coming in sight of the up distant-signal at Towneley it was at "danger." The home-signal was also at "danger" when I first saw it. On approaching, it was lowered for us, and we drew up to the starting-signal at the east end of the platform. When we had stopped for about a minute we were run into by the banking engine. My driver did not whistle for the banking engine when passing through Burnley. It was just coming daylight when the accident occurred, and it was a calm morning.

6. *Joseph Birkby*, passenger guard 15 years, states: On the 2nd instant I was in charge of No. 31 special, 7.35 p.m., Windermere to Wakefield. The train consisted of engine and tender and 15 vehicles (front break-van, one second-class, one first-class, nine third-class, one first-class and one second-class carriage, and rear break-van). There was continuous break-power on ten vehicles, five coupled to each van. I was riding in the rear van. We left Windermere at right time, lost 65 minutes into Preston, and 109 more between Preston and Blackburn, by other trains being in front. We were practically stopped at every signal-cabin between Preston and Cherry Tree. We lost 14 minutes between Padiham junction and Rose Grove by other trains in front, so that we were about three hours late when the collision occurred. On approaching Burnley all the signals were off, but on coming into sight of the up distant-signal for Towneley it was at "danger." We were then running at about 20 miles an hour. We ran up to Towneley up starting-signal and came to a stand there. One carriage and my van stood just outside the up home-signal. I did not hear my driver whistle for the pilot on passing through Burnley, nor was I aware that it was following us, until we had been standing about half a minute, when I looked out of the window and saw it coming at a good speed, blowing off steam through the pet taps. I jumped out of my van, and the collision immediately after occurred. I think when the pilot engine came into collision with us it was running about 10 or 12 miles an hour. The collision knocked the passengers about a good deal in the two carriages next to my van. I went to inquire as to the injuries, and then some passengers I knew came to assist those hurt, and I went back to protect my train. The front wheels of my van were off the rails, and the underframes of the van and next carriage were damaged. Some windows were broken. Although I did not know it was coming, I expected the pilot to follow. It usually overtakes us before we get half-way between Burnley east cabin and Towneley. We were not going faster than usual before we commenced to stop. We do not usually slacken for the pilot. When I first saw it it was about 200 yards off. I saw it quite plainly. The home-signal as well as the starting-signal was at "danger," as it had been thrown up after the engine of my train had passed it. I know Rule 120a, but it has not been attended to. I had not seen the new rule before the date of the accident.

7. *Thomas Grundy*, guard seven years, states: On the 2nd instant I was in charge of the front van

of the excursion train. On passing Burnley all the signals were off. We were then running at about 20 or 25 miles an hour. On approaching Towneley I saw that all the signals were against us. We at once commenced to reduce speed. On approaching the up home-signal cautiously it was lowered, and we drew within its protection to the starting-signal. We had only just come to a stand, certainly not a minute, when the banking engine ran into us. I did not know it was following us till the collision occurred. I felt a slight shock, but was not knocked down. I know this bank well. We were not running any faster than usual. It is not usual to reduce speed for the pilot by means of the breaks, but the speed is of course reduced by the bank. The station-master arrived at the scene of the accident in about five minutes after it had taken place, and at once attended to the passengers. My break was slightly on.

8. *Henry Pilkington*, driver, states : I have been in the service about 11 years, 4 years as banking pilot driver on the Burnley incline. On the 2nd instant I came on duty at 4.30 a.m. till 8.30 a.m., and again at 6 p.m. I ought to have gone off duty at midnight, but in consequence of the excursion train being late, and the subsequent accident, was at work till 8.30 a.m. on the 3rd instant. I was standing with my engine in the platform siding at Burnley as usual, waiting there. My duty was to assist trains over the bank during the night. I was there when the Windermere special came through the station. I thought the driver whistled for the pilot to assist him, although it was not the usual distinct crow or call for the pilot. I thought it was intended for it, as I had assisted him over the opposite side of the bank on the previous morning. As soon as the train had cleared the siding points the pointsman pulled the points over, and the signals off, and I followed the excursion train immediately to assist it. It went through the station at a good speed, I should think at about 30 miles an hour, and when I got out on the main line with my engine to follow it, I saw the excursion train tail lights disappearing under the next bridge about 400 yards from me. On passing Towneley up distant-signal I saw that it was on, but could not see the home-signal for that station because of the steam of the excursion train in front of me. On passing the distant-signal I was about 200 to 300 yards in rear of

the excursion train. I kept it in view in front of me all the way, and on nearing Towneley station I noticed that it was slackening. I called to my mate to "steady on" and reversed my engine. I was about 100 yards from the train in front of me when I did this. I was then going about 15 miles an hour. All the lights in the rear of the excursion train were burning brightly. I did not see the home-signal at Towneley until after the collision, because of the steam and smoke, but afterwards I saw that it was at "danger." I can only account for running into the excursion train by the sudden stop made by it. I was not able to pull up equally as quick. The excursion train was not running faster than usual through Burnley station. Trains do not usually check for the pilot, but go as hard as the bank will let them. I generally catch up a heavy train between east cabin and Towneley, but sometimes not till beyond Towneley. I looked out for the signals but could not see them for the steam, and then kept my attention on the tail lamps. I got steam against my engine, and the tender breaks were hard on and acting well. I was not blowing off steam through the pet taps on approaching the train. I had shut the taps between the bridges. I never heard of the new rule till after the accident.

9. *Alfred Cotsworth*, fireman two years, states : On the 2nd instant I was fireman to Henry Pilkington. The driver of the excursion train gave one crow on passing through Burnley station, and, after it had passed, we followed it out of the siding. My driver opened the cylinder taps just as he started, but shut them again when nearing the second bridge. We lost sight of the train between the two bridges, but caught sight of it again before it reached Towneley up distant-signal. I was looking out in front and saw the tail lights of the train, but could not see the distant-signal in consequence of the smoke and steam from the engine of the excursion train. I was standing at my break, and my attention was fixed on the tail lights, so that I did not see any of the signals. On nearing Towneley station, and when we were about 100 yards from the train, it slackened, and I immediately put on my break, and the driver reversed his engine. The passenger train was quickly brought to a stand, and before we could pull up we ran into the rear of it at about six or seven miles an hour.

Conclusion.

This collision was due to want of care on the part of the driver of the Burnley pilot engine, while engaged in the dangerous operation of pursuing the Wakefield excursion train, in order to overtake it and assist it up the incline. Not anticipating that this train would be stopped by signal, and expecting that, as usual, he would have to catch it up while running at some considerable speed, he evidently confined his attention to the tail lamps of the train, and did not observe that the Towneley up home-signal was at "danger," although the fact of the up distant-signal being at "danger" when he passed it ought to have made him more cautious. He was consequently unable to stop his engine, or to reduce to a speed of much less than ten miles an hour, before striking the tail of the excursion train, which had been standing for perhaps nearly half a minute at the Towneley up starting-signal. The man has had four years' experience of this work, and therefore this collision shows that, although the operation of pursuing trains may be carried on for a long time without any ill results, yet that it is liable to lead to an accident at any moment, even when experienced men are engaged in it.

There had been for some years a rule in the Company's book forbidding the practice, but it had gradually been allowed to fall into disuse, and the new rule on the subject (inserted above) was brought out and communicated by letter to the Company's district superintendents in the autumn of 1878.

Owing to a change of officers in the Burnley district three days after this letter was

issued, and the perhaps unavoidable confusion due to the transfer of the office, it was unfortunately overlooked and not brought to the notice of the present district superintendent, who consequently omitted to issue the necessary instructions to the station-masters and others concerned.

The rule having now been printed and properly circulated, it may be reasonably expected that upon this line the public will not for the future be exposed to danger from this class of accident.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major R.E.

Printed copies of the above report were sent to the Company on the 7th July.

LONDON AND NORTH-WESTERN RAILWAY.

Board of Trade, (Railway Department,)

SIR,

13, Downing Street, 30th June 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 3rd instant, the result of my inquiry into the circumstances connected with the collision that occurred on the 31st ultimo, between an up express and a down passenger train, at the crossing near Bloomfield junction where the Prince's End branch line from Walsall joins the Stour Valley Railway west of Tipton station, on the London and North-western Railway.

In this case, a branch line down train from Walsall to Wolverhampton over-ran the signals, and ran into an up express train from Wolverhampton to Birmingham, for which the signals had been lowered for the train to pass.

Forty-two passengers are stated to have been injured, some of them very seriously, on this occasion. A list of those injured is given in Appendix A.

The branch line train consisted of a side tank engine with seven vehicles (including one guard's break-van). It was running with the coal bunker in front. The left-hand buffer of the engine was broken, and the coal bunker was bulged in.

The up express train consisted of a tank engine and 10 vehicles, including three break-vans. Of these, three were thrown entirely off the rails, one was found lying on its side on the down main line, one stood across both lines of railway, and a third was off the railway but on its wheels; a fourth carriage had the rear wheels knocked from under the body, and a fifth carriage had the rear wheels off the rails. Five of the vehicles were badly damaged, and two others to a less extent.

Description.

The branch line from Prince's End and Walsall now approaches the Stour Valley Railway on a sharp curve, and on descending gradients for about 43·8 chains, commencing with a falling gradient of 1 in 326 for a length of 25·3 chains, which is succeeded by 1 in 90 for 7·4 chains, and by 1 in 226 for nearly 12 chains up to the crossing of the up main line by the down branch line. The junction itself as now made with the Stour Valley line, is about 213 yards further to the west; and a new signal-box has been lately erected 101 yards west of the junction, and rather more than half a mile west of Tipton station. The approach from the Walsall branch is protected by a down home-signal which stands in the fork between the two lines about 21 yards outside the fouling point, or 335 yards from the signal-box, and by a distant-signal 592 yards from the signal-box. About 286 yards north of this distant-signal there is an overbridge called Messrs. Barrow and Hall's bridge, which is referred to in the evidence, and this down distant-signal can be very well seen at a distance of 408 yards during clear weather, and for a considerable distance before this bridge is reached by a down branch line train. The traffic on the Stour Valley Railway at this point is worked on the block system, and the regulation governing this mode of working, which is stated to have applied to the two trains which came into contact on this occasion, is as follows:

"No. 8. Signalling at junctions. In order to secure a clear road for the important trains, the 'Be ready' signal for such trains must be passed on from the second section outside all junctions to the signalman at the junction-box. If the junction and the line on which the train will travel are clear, the 'Be ready' must be accepted; if not

clear, or if a train is approaching from any direction which the junction-point locking does not protect from collision, the signalman must deal with the 'Be ready' in accordance with the regulations laid down in clauses 5 and 6."

"For instance: Should two passenger trains be approaching upon converging or intersecting lines, the 'Be ready' must only be accepted for the most important one, the other train being brought to a stand-still at the outside section, and only allowed to proceed under the warning arrangement."

The special instructions for this signal-box state, "must block back to Tipton for all trains coming off the Prince's End branch."

"(Signed) W. SUTTON, District Superintendent."

Evidence.

Robert Humphreys, signalman at Bloomfield, stated: I have been in the service of the London and North-western Railway 14 years, 13 years at Bloomfield junction. I received the "Be ready" signal for the Walsall train from King Street crossing, Prince's End, at 7.40 p.m., which I accepted, all being clear. I received "train entering section" at 7.44 p.m. for that train. At 7.40 p.m. I received the "Be ready" signal from Deepfields for the up express train, which I acknowledged; this was after I had acknowledged the "Be ready" for the Walsall train. At 7.43 p.m. I received the "train entering section" signal from Deepfields for the express train. I then lowered my signals for the up express train to pass. I did not at any time lower my signals for the branch line train. When the up express appeared in sight under the bridge in the Bloomfield cutting, I at the same time noticed that the Walsall train had come under Messrs. Barrow and Hall's bridge on the branch line. The driver of the Walsall train had the steam on. He gave three whistles for the signal to be taken off. The steam was off when I next saw the Walsall train; it was then about the distant-signal. I did not hear the driver of the Walsall train whistle for the guard's break until within a few yards of the main line. The express train passed at its usual speed. I did not stop the express, as I was anxious to give it the preference, and I thought the express would pass before the branch train reached the crossing. After the passing of the 6.50 p.m. down express, Birmingham to Wolverhampton, I did not alter my needle from "train on line." About 7.40 I received the "Be ready" signal for the 6.55 p.m. down stopping train, Birmingham to Wolverhampton. I took no notice of it. Again at 7.44 the "Be ready" signal was repeated, and I replied to it by giving a warning signal. I could see the train standing at Tipton station at the time. I was working strictly in accordance with the instructions in the signal-box. I was authorised by the instructions to accept the "Be ready" for the express train after I had accepted the "Be ready" for the Walsall train, but I was not authorised to take off the signals for the up express train after I had accepted the "Be ready" for the Walsall train. I ought to have kept the signals on against the up express train. The same thing has been done before, but not frequently. I cannot say how often I have done it. I saw the Walsall train when it passed under Messrs. Barrow and Hall's bridge, and then it was running fast, running at great speed; and I think it was running about five miles hour when it got to about five yards of the main-line. I heard the crash of the collision. I heard the pop-whistle given just before the collision took place, at 7.46 p.m., but I did not hear the driver whistle before, after he had whistled for the signals in getting through Messrs Barrow and Hall's bridge.

Ernest Thornton stated: I have been in the Company's service 12 years, driver about six years. On the 31st May I worked the 7.5 p.m. passenger train, Walsall to Wolverhampton; commenced duty with this train. I had engine No. 208, side tank engine, running with the bunker first. I had a close-coupled train of six coaches and one extra. Left Walsall at

7.27 p.m., 22 minutes late, waiting Derby train. Stopped at Prince's End station, signals all off. The signals were off at King Street crossing, which is the telegraph block post, and 220 yards in advance of Prince's End station. The signals at Bloomfield junction were at "danger." I had shut off steam before sighting the distant-signal. I gave the usual whistles for the junction signals before passing under Messrs. Barrow and Hall's bridge; and on passing under the bridge, and before arriving at the distant-signal, I gave the break-whistles. As soon as the break was applied it skidded the wheels, and the fireman and I applied sand. The sand took no effect, and I told my mate to release his break and apply it a second time. I then found we were not pulling up sufficiently, and I reversed the engine and told the fireman to take the break off. As soon as I had reversed the engine the wheels skidded again, and before I could do anything more we came into collision with the train. We were not travelling above three or four miles an hour when we struck the train. I have been working this 7.5 p.m. train regularly for some months. I whistled once for the guard's break when I was near Messrs. Barrow and Hall's bridge. It was a clear night, raining slightly at the time, which, in my opinion, caused the rails to be very slippery. When between the distant and the home signal I saw the signal down for the up main line train. I did not then whistle for the guard's break. I do not know if the guard had his break on or not. I heard the driver of the express train whistle on approaching the fouling point, but do not know what whistle it was. My fireman jumped off about 50 yards before getting to the home-signal, but I remained on the engine. The left-hand buffer of my engine was broken, and the coal bunker bulged in. I think we were running at from 15 to 20 miles an hour when I passed under Messrs. Barrow and Hall's bridge. I was busy dropping sand down on the rails, so that I did not see that the signal was off for the up express train until I was between the distant and home signal. As soon as I saw the distant-signal was on at "danger" my mate put on the engine break before I passed through Messrs. Barrow and Hall's bridge, and I whistled for the guard's break as we were passing through that bridge. The break blocks on my engine were applied to the four coup wheels. Mine was a six-wheel, four wheel coupled engine. I go once a day over the branch and I know the line well. The engine was reversed when the collision occurred, and the steam was on; but the break was off. After the collision occurred, the train backed five or six yards beyond the home-signal.

Alfred Dutton stated: I have been in the Company's service 6½ years, fireman 5½ years. On 31st May I was fireman of the 7.5 p.m. passenger train from Walsall. I have worked on this train alternate weeks for the last three months. My mate shut off the steam before sighting the distant-signal, and remarked it was a nasty night. I at the same time turned the break on, and applied it harder when I sighted the distant-signal at "danger." It skidded the wheels. I took it off and applied some dry sand, and put it on a second time. I took it off and put it

on four or five different times, and at last my mate told me to take it off altogether, and he reversed his engine. We were then about 50 yards from the main line, and we continued with the engine reversed until we struck the train. Steam was on against it. My mate whistled for the distant-signal as soon as he sighted it, and directly afterwards he whistled for the guard's break. We were just coming under Messrs. Barrow and Hall's bridge. He again whistled for the guard's break when between the two signals. He did not whistle after that. When we shut off steam we were running about 20 miles an hour. I noticed the signal for the express off when we were just inside our distant-signal. I jumped off about 20 yards from the point of collision. When we ran into the express we were only just moving about three miles an hour. I heard the driver of the express whistling, but cannot say what it was for.

George Rolfe stated: I have been in the service seven years, guard about five years working on the Prince's End branch. I was guard of the 7.5 p.m. passenger train from Walsall on the 31st May. The train consisted of six twins and one loose composite in front. I rode in the last carriage, which had a break in it. We left Walsall 22 minutes late, waiting Derby train. All went well to Prince's End station. On approaching the Bloomfield junction distant-signal we were running about 20 miles an hour. I heard the driver give the three whistles for the signal; this was just before arriving at Messrs. Barrow and Hall's bridge. After passing under the bridge about 30 yards, the driver whistled for my break. I immediately applied it, looked out and saw the signals on. I looked out and saw the distant-signal on before I passed it. My break was on before passing it. The driver did not whistle again for the break. The wheels did not skid until just before we struck the express. We had stopped at two or three stations, and the break acted all right. The weather was the same all the way. I do not think it was raining at the time of the collision. The train only went back about a foot after striking. No damage was done to my train. I was in the rear van. Had two third-class breaks and a full train. Some of my passengers complained. I hardly felt the shock. We had almost come to a stand when the collision occurred at 7.45 p.m. My break was on when the collision took place. I had been five times over that line on that day.

John Whittle stated: I have been in the service 25 years, driver 19 years. On 31st May worked the 6.57 p.m. passenger train, Stafford to Birmingham. Left Stafford at 7.3 p.m. Left Wolverhampton at 7.33 p.m., six minutes late. Was stopped at Monmore Green. Line blocked at Deepfields by goods train shunting; stopped there one minute. On sighting the signals at Bloomfield junction they were all off. We slackened at Spring Vale as usual. Passed Bloomfield junction at the rate of from 15 to 20 miles an hour, having slackened speed through subsidence from mines. On passing under the Great Western bridge I first noticed the 6.55 p.m. passenger train from Birmingham at Tipton station, and I then saw the Walsall train approaching on the branch, and was in doubt whether he would be able to stop or not; and on approaching nearer I saw the fireman jump, and then concluded they could not stop, but it was too late for me to do anything. The tender end of the engine caught the third vehicle from me. I broke loose and ran away with three coaches and two vans. I left two coaches and a van on the bank, and took one coach and van to Birmingham with the passengers. The train broke loose between second-class carriage 129 and third-class carriage 1044. I did not see the

Walsall train until it was about 50 yards from the main line. I thought it was rather close to the main line. Mine was a tank-engine larger than the Walsall train engine. I had a van, two coaches, another van, five more coaches, and then another van with one guard riding in the last van. I had Clark and Webb's break worked from the engine on the three carriages from the rear van, and I had the power of putting them on as well as the guard. There was an hydraulic break on my engine, which was an eight wheeled tank-engine, four wheels coupled, and the break was applied to these four wheels.

Edward Beasley stated: I was working the 6.55 p.m. passenger train from Birmingham to Wolverhampton on 31st May. This train is timed to stop at Tipton. On leaving Tipton, the starting-signal was off. Got no verbal warning that the junction was blocked. On drawing up to the signals at Bloomfield, saw the Walsall train coming round the curve, travelling from 15 to 20 miles an hour, about fifty yards from the junction, as far as I could judge. I saw the driver reverse his engine. Did not see any fire from the guard's break. Noticed fire flying from the engine wheels. It was not raining there at the time. The rails were at the time in a greasy condition. The distant-signal arm is on the starting-signal post for Tipton, and I understood from the fact of that being on at "danger" that I had to stop clear of the junction. Before I passed Watery Lane I noticed all the signals off, including the starting-signal. When I first saw the Walsall train the steam was off. I did not see it put on again. I was engaged in putting on the patent break.

Imri Skeley stated: I am signalman at Coopers crossing, doing temporary work at Bloomfield, slackening trains over sidings both for Stour Valley and Prince's End trains on the 31st May. When on this side of Messrs. Barrow and Hall's bridge the driver of the Prince's End train whistled for the signal to be taken off. He shut off steam between the bridge and the distant-signal, and not before he passed through the bridge, or about 200 yards from the branch distant-signal. This was about 200 yards from the distant-signal. I only heard this one whistle. Saw the fireman screwing the break on between the distant and home signals. Cannot say whether this was the first time he put it on. They were then running about 20 miles an hour. I did not notice the guard's break. The only place where sand was put on was about three yards from the main-signal. The rails were very slippery. I should have seen some more sand if there had been any. I walked back to see where sand had been used. The fireman dropped off near me very quietly. He jumped in the fork on the left-hand side of the engine. I thought the train would stop. It was coming at the usual speed. It was travelling very slowly when the collision took place.

Joseph Stanyer stated: I am signalman at Tipton box, have been at this box four years, and in the service 9 years. I got "line clear" for the 6.50 down express train at 7.41. I received from Dudley Port the "train entering section" for the 6.55 p.m. at 7.41 p.m. I passed the "Be ready" on to Bloomfield for the 6.55 train at 7.41 p.m. It was acknowledged. The train arrived at Tipton at 7.43 p.m. and departed at 7.44 p.m. As it was leaving the station I received the warning signal from Bloomfield, but too late for me to call the driver's attention, the signals all being off on the arrival of the train at Tipton station.

Conclusion.

From the preceding statements it appears that the signalman on duty at Bloomfield junction signal-box received the "Be ready" signal from the King Street crossing

signal-box, Prince's End, for the 7.5 p.m. passenger train from Walsall to Wolverhampton at 7.40 p.m., and he accepted this signal, all being clear. At the same time, but following the acceptance of the "Be ready" signal for the branch line down train, he received another "Be ready" signal from Deepfields on the Stour Valley line for the up express train, which he admits having also accepted. At 7.43 p.m. he states that he received the signal "Train entering section" from Deepfields for the up express train, and he then lowered his signals for the up express train to pass. The points and signals in the new signal-box at Bloomfield junction are interlocked, and, in consequence, he could not then take off the signals for the down branch line train to pass, and those signals stood at "danger" as the down branch line train approached the crossing. At 7.44 he received the "Train entering section" signal from King Street crossing, Prince's End, for the down branch line train from Walsall, and he observed the up express train on the Stour Valley line under the bridge in the Bloomfield cutting, at the same time as he noticed the down branch line train from Walsall, come from under Messrs. Barrow and Hall's bridge on the branch line.

So far there is no material difference in the statements of the signalman in the Bloomfield junction signal-box and those of the driver and fireman of the branch line down train from Walsall. The signalman also says that when this train passed through Messrs. Barrow and Hall's bridge the driver of the train still had the steam on, and that the train was running at great speed, while the driver and fireman of that train state that the steam had been shut off before sighting the down distant-signal, and on the ground the driver pointed out to me that it was done before he could see the down distant-signal through the bridge opening. The driver and fireman explained how the break on the engine was put on and taken off repeatedly when the wheels began to skid, and taken off altogether and kept off when the engine was reversed and the steam applied the reverse way just before the collision occurred.

I could not learn that this driver had received any instructions from the superintendent or locomotive fireman that he was to do anything of the kind, as to taking off and putting on the engine break when the wheels skidded, and it is quite possible that the collision was finally caused by its being done. It further appeared that this branch line down train was still running at the rate of three or four miles an hour when it fouled the up main line, as the up express train passed at its usual rate. The branch line down train appears to have first struck the third vehicle (a third-class carriage) from the engine of the up express train, and badly damaged it and the two following vehicles, a van and a second-class carriage, the rear wheels of this last carriage being thrown off the rails and separated also from the after part of the train. The express train engine and tender, with five vehicles attached, pulled up with the last vehicle, having its rear wheels off the rails, about 150 yards from the carriage which stood across both lines of railway. The branch line down train was 22 and the up express train 6 minutes late on this day.

The signalman's statement as to the fast running of the branch line down train, and as to the place where the steam was shut off, is supported by the evidence of the driver of the 6.55 p.m. down main line passenger train, which was approaching the Bloomfield junction from Tipton station (at the same time as the two other trains that came into contact with each other) also in complete disobedience to the special instructions for the Bloomfield junction signal-box, issued by the district superintendent, Mr. Sutton. This engine-driver observed the branch line down train approaching the junction at the rate of from 15 to 20 miles an hour when about 50 yards of the crossing.

Search was also made for the sand which it is stated was used by both the driver and fireman of the branch line down train engine, but it is said to have been found only at one spot, a few yards from where the collision took place. The 6.55 p.m. down main line train, which was approaching the crossing from Tipton station, consisted of an engine and tender and nine vehicles, six of which were fitted with Clark and Webb's patent break; three of these breaks were under the control of the driver, and three under the control of the guard, and the three carriages which were not fitted with breaks were placed next to the engine.

The branch line down train only had one break to seven vehicles, independent of the engine break.

The collision resulted from an improper mode of working the absolute block system on the part of the signalman at Bloomfield junction, in having, immediately after he had accepted the "Be ready" signal for the branch line down train from Walsall, also accepted the "Be ready" signal for an up main line express train, and lowered the up main line signals for this express train to pass. If the signalman had, on the

receipt of the "Be ready" signal for the branch line down train, at once followed its acceptance by taking off the branch line down signals for this train to proceed, no collision could have taken place, inasmuch as the main line up express train, if it had over-run the signals which would necessarily have been on at "danger" against it, the interlocking would have ensured that the facing-points at the junction must have been shifted so that the express train would have been diverted on to the up branch line instead of continuing to run straight on on the up main line, and across the branch down line on the level where the collision actually took place.

The signalman did wrong in accepting the "Be ready" for the up express train and lowering the signals for it to pass after he had acknowledged the "Be ready" for the down branch line train, without lowering the signals for this train to pass. The regulation draws attention to "a clear road for the important trains," but it does not tell the signalman what he ought to have done after he had accepted the "Be ready" for the branch line down train, and unfortunately he paid attention to the "important train," the up express. Again, if the signalman had only followed what is given as the exemplification of Rule No. 8, and only accepted the "Be ready" for one of these trains, no collision would have ensued.

It must further be noted that a down main line passenger train, the 6.55 p.m. from Birmingham to Wolverhampton, was permitted at the same time, by the same signalman, to leave Tipton station for Bloomfield junction after the "Be ready" for the branch line down train was accepted. A warning signal is said to have been received at Tipton station signal-box from Bloomfield junction, but not until it was too late and after the train had actually started.

These mistakes in the block working undoubtedly point to the desirability of combining the working of the electrical instruments used in carrying on the absolute block system with the interlocking of the points and signals, that prevent similar mistakes from being made by the signalmen, which is partially in operation, and I understand with success, on some of the Metropolitan railways.

Notwithstanding this error in the working of the absolute block system on the part of the signalman at Bloomfield junction, no collision need have taken place if the servants of the Company, viz., the engine-driver and fireman of the branch line down train from Walsall, had been more careful and had reduced the speed of their train, on finding the signals on at "danger" against them, so as not to over-run the junction signal. The distant-signal is not by any means well placed or sufficiently distant from the crossing to offer any reasonable security against collisions when the weather is not clear; but on this occasion the down distant-signal could be seen, and it is admitted was seen for a long distance, and there is no excuse whatever for over-running the home-signal. It is true that this train was not provided with a proper amount of break-power, as no one scarcely now contends that one break for seven vehicles, independent of the engine break, is a proper and sufficient amount of break-power for a passenger train.

I was greatly struck, when visiting Bloomfield junction to inquire into this collision, at noticing the relative position of the junction signal-box, the crossing of the up main by the branch down line, and the position of the branch down signals for covering that crossing, and I mentioned that I had seen nothing like it, and that I must ascertain, when I returned to London, which of the Inspecting Officers of the Board of Trade had passed such a junction.

A new signal-box has recently been put up nearly 100 yards further away from the junction points and crossing than that previously used, and the junction points are now 213 yards from the crossing; and on examining the documents lodged by the Railway Company at the Board of Trade prior to the branch line, then called the Tipton branch, being inspected, I found that I was the officer who made the inspection in August 1863. In consequence, I requested that I might be informed what distance the junction points had been shifted, and in reply I was informed that the branch line was opened for traffic in 1864 (*see* Mr. Sutton's letter, dated 10th June), and *no change* in the position of the junction had been made *since that time*.

I have no information as to the position of the branch line down home and down distant signals or of the signal-box at the time when I made the inspection in 1863, but I think the position of the signal-box and branch down distant-signal must have been altered, as the down distant-signal is only 278 yards from the fouling-point, which distance is such as to offer no sufficient protection to the crossing in hazy or foggy weather, as the branch line falls for half a mile towards the main (Stour Valley) line.

I had no means of ascertaining positively, whereabouts the junction was made in

1863, and, in consequence, I applied to Mr. Stevenson for information on the subject, that I might be enabled to trace what had been done, and to know when the change was made, and under what circumstances. Mr. Stevenson is unable to give me any information as to when the change was made and under what circumstances, and I have received no further information from the Company's officers on the subject. But by comparing the details of the branch line, formerly supplied to the Board of Trade by the Company's engineer prior to its inspection in 1863, with the distances recently measured on the ground and those supplied by the Company's engineer, Mr. Stevenson, at the present time, I find that the position of the junction points must have been shifted somewhere about 170 yards.

This alteration involves a very serious question. Is any railway company justified in altering the arrangements submitted to an officer of the Board of Trade directed to inspect a new line before it is opened for traffic, and on which he recommends the Board of Trade to sanction the opening of the line for traffic, and altering them so much for the worse, that the junction has been shifted 170 yards further from the crossing at which the collision occurred? The signalman is now placed in a box 314 yards from the crossing, whereas if he had been doing duty in a box close to the crossing he might have been enabled, at the last moment, when he saw that the branch line down train was not likely to stop clear of the up main line on which the express train was running, to have shifted the facing-points (after replacing the up main line signals at "danger"), and to have diverted the up express train on to the up branch line, and thus have averted the collision and saved so many persons from serious injury.

I cannot think that any railway company is authorised to make any such change without the authority of the Board of Trade, but I know that this is not a solitary instance where equally important changes have been made after the opening of a line for passenger traffic has been sanctioned by the Board of Trade.

The London and North-western Railway Company, in their altered telegraph arrangements for working the absolute block system, are undoubtedly complying, to a considerable extent, with the repeated representations from the Inspecting Officers of the Board of Trade, as to not permitting two trains to approach a junction at the same time on lines that cross or converge towards each other. I annex a copy of these regulations. It would be very desirable if they could be greatly diminished in length; that the distinction between *important* and other passenger trains should be done away with; and, as regards passenger trains approaching junctions, that the signals should be taken off for the "Be ready" signal, which is first accepted by the signalman, and the second "Be ready," for a passenger train, should not be accepted when the advance of this second train would endanger the safety of the first if the driver should overrun the signals.

I was also informed that the London and North-western Railway Company had now 2,019 vehicles fitted with patent breaks, 1,545 with chains, exclusive of West Coast stock, of which there are 176 fitted with breaks and six with chains; that 246 London and North-western vehicles have been fitted with breaks and 105 with chains since the 1st January last.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

P.S.—I delayed sending in my report for a considerable time in the expectation that I should receive further information from the Company as to the position of the junction at the time of my inspection; and the day after I sent in the preceding report I received another communication from Mr. Stevenson, dated 30th ultimo, enclosing an extract of a letter and a sketch from Mr. Woodhouse, the letter stating that "there has been no change in the position of the junction points; the sketch on fly leaf shows the original position of the junction cabin."

"The junction was put in originally as it is now."

(Signed) "H. WOODHOUSE."

I immediately called on Mr. Stevenson and showed him the documents which had been handed in to the Board of Trade by his predecessor, the late Mr. Baker, which give the distances, gradients, curves, bridges crossed over or under, on this Tipton branch from the starting or fixed point at Wednesbury commencing at the level crossing at Church Lane, Prince's End. Mr. Stevenson's and Mr. Woodhouse's

measurements supply the following positions of the level crossings, bridges, &c., and I have placed alongside of them those extracted from Mr. Baker's documents.

From Mr. Stevenson's and Mr. Woodhouse's measurements.

From Mr. Baker's details.

	m.	ch.	m.	ch.
Church Lane level crossing occurs at	1	77	1	77
Occupation bridge	2	2·61	not given.	
Level crossing	2	7·8	2	7·0
Hall Street overbridge	2	23·81	2	24·0
Regent Street overbridge	2	27·86	2	28·0
Occupation overbridge	2	30·30	2	30·0
Occupation overbridge	2	41·60	2	42·0
Occupation underbridge	2	45·52	2	46·0
Bloomfield canal underbridge	2	47·13	2	48·0
Occupation Road underbridge	not given		2	54·5
End of the branch line in 1879	2	78·04		
„ „ 1863	—		2	70·25

So that the junction at the present time appears to have been shifted 7·79 chains, if the details supplied to the Board of Trade in 1863 were correct.

I was, however, shown by Mr. Stevenson a communication from Mr. Baker, giving instructions that the site of the junction was to be changed, by carrying the rails close to and parallel to the rails of the up and down lines of the Stour Valley Railway up to the Bloomfield Basin signals. This communication was dated April 1863, and it was then expected that the branch would be opened on the 1st June, and I have no doubt that the intention was to shift the position of the junction from what was first laid out.

This junction curve was not made in accordance with the authorised Parliamentary plans which sanctioned a junction to the south near Tipton station, whilst that constructed was made to the north. I inspected the Tipton and Darlaston branches early in August 1863, and made my report on the 8th of that month, and the Board of Trade directed the opening to be postponed for one month, in consequence of certain things being required to be done, and authority to open the line for traffic was not given until the 5th September 1863.

I requested Mr. Stevenson to obtain further evidence as to when the junction was first made, and to let me know for what purpose the hut in the fork was placed.

I now enclose the further evidence, dated the 3rd instant. It appears to be that of a platelayer, and to the effect that the points were put in, as they are now, by Mr. Baker's authority, and the parallel rails laid in at the same time as the present junction. I do not dispute this assertion, but merely that the present junction is not that which I looked at. No information is forthcoming about the hut, which was probably the original signal-box.

I have examined my note-book, which records all the deflections of the girders under a rolling load, and there is no particular allusion to the junction being an unusual one. A hut still stands in the fork between the branch and main line. I stated that the signals at the four junctions were not in working order, and I am satisfied that I did not see the line in the position which it now occupies with parallel rails to the Stour Valley rails for a length of seven or eight chains. If it had been, another bridge over a turnpike road should have been inserted in Mr. Baker's details, which I should have had to look at.

W. Y., 4th July 1879.

LONDON AND NORTH-WESTERN RAILWAY.

District Superintendent's Office,

New Street Station,
Birmingham, June 10, 1879.

DEAR SIR,

I ENCLOSE a diagram giving particulars you require with regard to the carriages. The junction, I am informed, was opened in 1864, and has not been altered since that time.

Yours faithfully,
W. SUTTON.

Colonel Yolland,
Board of Trade,
13, Downing Street,
London.

LONDON AND NORTH-WESTERN RAILWAY (SOUTHERN DIVISION).

Engineer's Office,
Stafford, June 12th, 1879.

Bloomfield Junction.

DEAR SIR,

Mr. Frank Stevenson informs me you wish to be furnished with some distances at this place.

On fly-leaf I have pleasure in handing you sketch giving the required information.

Yours faithfully,
H. WOODHOUSE.

Colonel Yolland,
Board of Trade,
Whitehall.

13, Downing Street,
16th June 1879.

DEAR SIR,

I HAVE received from Mr. Woodhouse the distance between the canal bridge and the present facing-points at Bloomfield junction, and this distance entirely confirms my statement that the position of the junction must have been moved.

But it is not safe to depend upon a single measurement; and I should, therefore, feel obliged if you would be good enough to cause me to be supplied with the distances, measured from the King Street crossing, Prince's End, to the several over and under bridges up to the Bloomfield junction, that they may be compared with those furnished by the Company prior to the branch being inspected.

The measurements go to prove that the position of the junction has been shifted more than 150 yards, and under these circumstances I must ask when the change was made, and under what circumstances.

I inspected the line in July or August 1863.

Yours faithfully,
F. Stevenson, Esqre. (Signed) W. YOLLAND.

LONDON AND NORTH-WESTERN RAILWAY.

Engineer's Office, Euston Station,

MY DEAR SIR, London, June 19th, 1879.

REFERRING to your note of the 16th inst., on the other side is statement of distances from the level crossing at Prince's End station to the various bridges situated between that point and the canal bridge, as measured from our corrected plans, and these, with the distance already furnished by Mr. Woodhouse, will, I believe, give the information you require.

Having no personal knowledge of any alteration in the position of the junction at Bloomfield since its inspection in 1863 (not 1873), I have referred the latter part of your note to our manager, Mr. Findlay, who is inquiring into the matter.

Yours faithfully,
Colonel Yolland, R.E. FRANCIS STEVENSON.

Distances from Church Lane level crossing at Prince's End station to bridges between that point and the canal bridge, measured in the direction of Bloomfield junction.

From	chains	links.
Church Lane to occupation bridge	- 5	61
" " to level crossing	- 10	8
" " to Hall Street bridge	- 26	81
" " to Regent Street bridge	- 30	86
" " to occupation bridge	- 33	3
" " to occupation bridge	- 44	60
" " to occupation bridge	- 48	52
" " to canal bridge	- 50	13

LONDON AND NORTH-WESTERN RAILWAY.

Engineer's Office, Euston Station,

MY DEAR SIR, London, 30th June 1879.

REFERRING to your letter of the 16th inst., although no delay has occurred, some little time has necessarily been occupied in ascertaining the information you require in connection with our Bloomfield junction.

However, I now send you, on the other side, extract from a letter dated 28th inst., received by Mr. Findlay from Mr. Woodhouse, which, together with the distances set forth in my letter of the 19th inst., will, I think, place in your possession of all the facts of the case.

Yours faithfully,
Colonel Yolland, R.E. FRANCIS STEVENSON,

Extract from Mr. Woodhouse's letter to Mr. Findlay,
28th June 1879.

"Bloomfield Junction.

"Yours of June 26th.

"There has been no change in the position of the junction points; the sketch on fly-leaf shows the original position of the junction cabin.

"The junction *was* put in originally as it is now.
"C. H. WOODHOUSE."

LONDON AND NORTH-WESTERN RAILWAY.

Engineer's Office, Euston Station,

MY DEAR SIR, London, 3rd July 1879.

IN accordance with the promise made at our interview when you were here on Tuesday last, I wrote to Mr. Woodhouse as to the question you raised about the alteration to the points at Bloomfield junction, and now enclose copy of his reply.

Yours very truly,
Colonel Yolland, R.E. FRANCIS STEVENSON.

Engineer's Office,
Stafford, July 2nd, 1879.

Bloomfield Junction.

Your favour of yesterday.

DEAR SIR,

THE platelayer who laid in the junction states: the points are in the same position as when they were put in, except the points on the up road, which have been removed 10 feet back to allow the locking-bar to be fixed. The parallel rails were put in at the same time as the junction. The points were put in as they are now by Mr. Baker's authority, but probably the position does not agree with that shown on the Parliamentary plan.

Yours truly,
F. Stevenson, Esq. (Signed) H. WOODHOUSE.

APPENDIX A.

Collision at Bloomfield Junction, May 31st, 1879.

List of Injured.

Law, Horace, leg injured.
Brown, Charles Chard, elbow fractured and head injured.
Levey, Bernard, head injured.
Wood, John, externally wounded.
Smith, Arthur, shoulders injured.
Morgan, Davis Lewis, shaken.
Skinner, Edward, shaken.
Skinner, Margaret, shaken.
Cook, Ann, bruised and shaken.
Cook, Phoebe, (baby), bruised slightly.
Cook, Job, (boy), bruised slightly.
Mausell, Mary Jane, head bruised and shaken.
Slater, Isaiah, leg fractured.
Madden, William, shaken.
Bristow, Arthur, leg injured.
Hewith, William, leg injured.
Neale, Emma, leg and face injured.
Fereday, Thomas, head injured.
Haydon, William, elbow injured.
Robotham, Edwin, knee and shin injured.
Leaver, Henry George, face injured.
Jacques, Samuel, shaken.
Harrison, Lomas, shaken.
Harrison, Henrietta, shaken.
Mousdale, ribs fractured.
White, Alfred, concussion of brain and shaken.
Cook, Joseph, shaken.
Ritchie, James, shaken and elbow injured.
Davis, H. J., shaken.
Clarke, Arthur, head injured and shaken.
Allen, James.

Walton, Frank.
Horton, Thomas, shaken.
Richards, Henry, shaken.
Richards, Mrs., and three children, shaken.
Darby, Martha, and three children, shaken.

APPENDIX B.

LONDON AND NORTH-WESTERN RAILWAY.

Revised General Regulations for Train Signalling by Block Telegraph.

BLOOMFIELD Signal-box. TIPTON Station.

GENERAL INSTRUCTIONS FOR WORKING THE THREE WIRE SYSTEM.

1. When the instruments are not in use, always keep the handles upright.

The indicators and bells must not be worked quickly, but each movement must be made slowly and distinctly.

The signalmen on giving signals must see that the indicators are firmly and completely blocked over.

The instruments are to be kept perfectly free from dust, dirt, grease, &c.

Lamps or other articles must not be placed in the battery cupboards.

2. All signals sent and received must be immediately entered in the train register book, where provided for that purpose.

The entries must be in ink, and no erasures are to be made under any circumstances; if an incorrect entry is made a line must be drawn lightly through it, and the correction made above or below it, so that the original entry may be clearly seen.

BELL SIGNALS.

	Number of Strokes.	See Clause.
Attention or acknowledgment - - -	1	
Train or engine entering section - - -	2	
Be Ready Signals:—		
Express passenger train	3	
Ordinary " "	3 given thus— ●pause●●	
Light engine or engine and break-van - -	3 " ●●pause●●	4
Express goods, cattle, or fish train - - -	4	
Fast goods train - -	4 " ●●pause●●●	
Ordinary goods, mineral, or ballast train - -	4 " ●●●pause●●	
†Bank engine (in rear of train) - - -	4 " ●●●pause●●	
Signal given in error -	*5	9
Take off slot—train waiting	5 " ●●●pause●●●	10
Blocking back signal -	6	6
Section clear, but station or junction blocked -	6 " ●●●pause●●●	6
Imperative obstruction -	*6 twice.	12
Shunt train for fast train to pass - - -	*7	13
Stop and examine train -	*8	14
Train passed without tail lamp - - -	{ *9 To box in advance—●●●● —●●●● *9 To box in rear —●●●●●●●●	15
Approaching train separated - - -	*10	16
Opening or closing switch	*11	17
Train running back - -	*12	18

	Number of Strokes.	See Clause.
Train or engine running away forward on right line - - -	*15 given in groups of three, repeated five times, thus— ●●● — ●●● — ●●● — ●●● — ●●●	19
Inspector's signal for testing apparatus - -	*16	20
Testing slots on signals -	*20 given in groups of five, repeated four times, thus— ●●●●● — ●●●●● — ●●●●● — ●●●●●	21

The bell signals marked * must be acknowledged by repeating them, and no signal so marked must be considered as understood until it has been correctly repeated. Should the station to which a signal is sent not reply, the signal must be repeated until duly acknowledged.

† Bank engines: When a train is assisted by a bank engine in the rear, the train must be signalled in the usual manner by the "Be ready" code denoting the description of train, and immediately after the train has entered the section, and the indicator has been moved to "Train on line," the "Bank engine" signal must be given on the bell, which must be acknowledged by one stroke. "Line clear" must not be given until the bank engine arrives and is shunted off the main line, or otherwise properly protected by the signals.

Signalmen are specially instructed to enter in the train register book the "Bank engine" signal, in order that no mistakes may arise by trusting to memory.

3. The normal position of all fixed signals is "Danger," except when required to be lowered for an approaching train.

The normal position of the block instrument indicators (or needles) is vertical (upright).

4. The "Be ready" signal must be given for all trains and engines at all block telegraph signal-boxes, and in the case of all important through trains must precede by at least one section the actual entrance of the train into the respective sections throughout the line.

The process of signalling a train is as follows:—

Prior to the despatch of a train from station A, the signalman will give to station B the signal "Be ready" (according to the description of train), and station B must, provided the previous train has passed his box and there is no obstruction on the line upon which the approaching train is to run, repeat the signal back to A, and point the indicator to "Line clear." The train may then be despatched from A. When the train is leaving station A, the signalman there must give the bell signal "Train entering section," which station B must acknowledge by pegging the indicator to "Train on line."

Station B, must then give the signal "Be ready" to station C. As soon as the train itself passes station B, the "Train entering section" signal must be given to C, who must then in like manner forward the "Be ready" signal to station D, and so on throughout.

As soon as the train has arrived at or been shunted at station B, as indicated in clause 5, the signalman must call the attention of station A by ringing his bell (one stroke), and having unpegged the indicator from "Train on line," point it to the right, signifying "Line clear," which A must acknowledge by repeating one stroke on the bell, and the indicator will then be left vertical.

After a train has been put in "block," the indicator must not be altered until the train has passed the station to which it has been signalled, except on receipt of the bell signal, intimating that the signal was given in error.

The "Be ready" signal must under no circumstances be accepted until the signalman has satisfied himself that the indicator of the block instrument does not shew "Train on line," and that the line on which the train so signalled requires to pass is perfectly clear. When the "Be ready" is not accepted it must again be given at short intervals.

If after the "Be ready" signal has been forwarded to the signal box in advance, and has been accepted, it is found that the train will not be able to proceed in the usual course, the "Be ready" signal must be withdrawn by giving five strokes on the bell, intimating that the signal was given in error.

5. The "Line clear" signal must be given in accordance with the following instructions:—

First.—For through non-stopping passenger and goods trains the signal "Line clear" must be given so soon as the train (complete with tail-lamp on last vehicle, and travelling at its usual speed) has passed into the onward section.

Second.—For trains stopping at station platforms, or having waggons to put on or off at sidings or in station yards, or having to shunt for other trains to pass, the signal "Line clear" must not be given to the signalling station in the rear until such train (with tail-lamp on last vehicle) has completed its work and gone forward on its journey at least a quarter of a mile, or has been shunted clear of the main line.

If, however, the "Be ready" signal is received for a light engine or a goods train during the time another goods train is standing at the station under cover of the home-signal, "Line clear" may be given, and the "Be ready" accepted, and the light engine or second goods train allowed to enter the section, it being signalled in the ordinary manner; but in foggy weather or snowstorms the warning regulations laid down in Rule 6 must be adopted instead of given "Line clear."

If the train at the station is a passenger train, or if the "Be ready" is received for a passenger train while any other train is occupying the station, the warning regulations laid down in Rule 6 must be adopted.

Any authorised modification in these general regulations to meet special cases will be notified in the form provided at the foot hereof.

6. If after the passage of a train, and prior to the "Be ready" being accepted for a subsequent one, the main line or lines are required to be fouled in any way, the signalman in charge must first call the attention of the signalman at the outside box or boxes affected by giving six strokes on the bell, and then pegging the indicator to "Train on line." This must be acknowledged by one stroke on the bell, and the indicator must remain pointing to "Train on line" until the obstruction has been removed. After, however, accepting the "Be ready" signal, care must be taken that the main line or lines are not obstructed in any way until the train signalled has arrived at or passed through the station; and if, on receipt of the "Be ready" signal for a passenger train or important goods train, the main line or lines are being occupied in any way, immediate steps must be taken to clear the road, in order that no delay or slackening by signals may be caused to the express trains.

Should the "Be ready" signal be received at any signal-box for a train before the previous train has arrived, or while shunting is going on affecting the main line outside the home-signal, the signalman will not reply, and the train must be kept waiting.

Should the previous train have arrived sufficiently within cover of the home-signal for the tail-lamp to be seen by the signalman, or should the shunting or marshalling be going on within cover of the home-signal, the signalman must not accept the "Be ready," but if detention is likely to arise he may reply by giving the signal six strokes on the bell, thus:—●●●●●●, which will signify "Section

clear, but station blocked." The train for which the "Be ready" signal has been given must then be stopped at the outside section, and after the driver has been warned of the state of things he may expect to find at the next signal post he may be allowed to proceed.

This instruction will not apply in the case of a goods train followed by another goods train, "Line clear" being given under such circumstances as laid down in the second paragraph of the second instruction of Rule 5, fogs and snowstorms excepted.

The signal for the driver to proceed under the "warning" arrangement must be given by the signalman showing a green hand-flag or lamp, and lowering the signal after the verbal caution has been given to the driver as to the state of things ahead. In cases where the signal-box is too far from the main signal to admit of the driver being verbally communicated with, the signalman must, after the train has been brought to a stand, exhibit a green hand-flag or lamp, and lower the signal to enable the driver to draw up to the signal-box. After the driver has been verbally cautioned as to the state of things ahead he may be allowed to proceed, the signalman still showing his green flag or hand-lamp, and lowering the starting-signal, where such is provided.

The train must then be signalled on the bell as entering the section, and the signalman at the station in advance, where the obstruction exists, must acknowledge the signal for the second train by one stroke, but must not signal "Line clear" until both the obstruction has been removed and the second train has properly cleared the section.

Signalmen must not give back too hastily the six strokes on the bell signifying "Section clear, but station blocked," as in many cases the obstruction at the station may shortly be removed, and the "Be ready" will be able to be accepted before the train for which it has been given has arrived at the outside section. This will prevent approaching trains being checked as must necessarily be the case when the six strokes (●●●—●●●) are given back.

Signalmen must enter promptly the time of receiving the signal for a train under the "Section clear, but station blocked" signal, so as to avoid giving "Line clear" before the train has arrived and the obstruction has been removed.

7. Where the sections are short, the signal "Be ready" must, as soon as it has been acknowledged, be sent forward to the signal-box in advance without waiting for the signal "Train entering section:" and where, as at large stations, there are two, three, or more signal-boxes within an exceptionally short distance from each other, the signal "Be ready," or the special signal for "Through train" (where such is in operation) must be transmitted forward in sufficient time for the line to be cleared, and signals lowered before they can be seen by the driver of an approaching train.

This regulation will require special attention when the approaching train is an express passenger train.

8. Signalling at junctions.—In order to ensure a clear road for the important trains, the "Be ready" signal for *such* trains must be passed on from the second section outside all junctions to the signalman at the junction box. If the junction and the line on which the train will travel are clear, the "Be ready" must be accepted; if not clear, or if a train is approaching from any direction which the junction point locking does not protect from collision, the signalman must deal with the "Be ready" in accordance with the regulations laid down in clauses 5 and 6.

For instance: Should two passenger trains be approaching upon converging or intersecting lines the "Be ready" must only be accepted for the most important one, the other train being brought to a stand at the outside section, and only allowed to proceed under the warning arrangement.

Should a passenger train be approaching at the same time as a goods train, and "Line clear" can be

given for the former, the goods train must only be allowed to come forward under the warning arrangement; or should "Line clear" have already been given for a goods train, the passenger train must only be allowed to come forward under the "Warning arrangement."

Should, however, two goods trains be approaching at the same time, they may (except during fogs and snowstorms) be allowed to come forward, the drivers controlling their engines in accordance with the signals shown on the distant-signal posts.

Any authorised modification of these general regulations to meet special cases will be notified in the form provided at the foot hereof.

Care must be taken to ensure priority to the most important train.

Special instructions are issued for junctions in station yards, and for those places where passenger platforms or ticket stages exist, at which trains have to stop short of the junction points.

Drivers in all cases, on approaching junctions, must have their engines under control, as laid down in Rule 276.

9. If a signal has been incorrectly given, the signalman who has made the mistake must give five strokes on the bell, signifying "Signal given in error," and the signalman receiving this signal must repeat it and unpeg the indicator from "Train on line," and allow it to hang vertical. This is to be acknowledged by one stroke on the bell, and the signalman is then to forward the correct signal.

If the "Be ready" signal is required to be cancelled, the signalman receiving the five strokes or the bell must repeat the same, and enter in his train register book (where provided) the fact of the "Be ready" signal having been cancelled.

10. Take off slot; train waiting:—The gong code ●●—●●● is to be given when a train has been brought to a stand at a junction or in a station yard, and the home-signal cannot be lowered in consequence of the slot being on from the box in advance. If the slot can be taken off, the five strokes (thuse●●—●●●) must be repeated, and after the driver has been warned the signal may be lowered to enable the train to proceed cautiously to the next box. *This code must not be given until the train has been brought to a stand.* "No reply" will indicate "Line blocked," and the train must be kept waiting until the slot is taken off.

11. In the event of a second train or engine arriving at a signal-box before the preceding train or engine has been telegraphed as clear from the station in advance, it must not be allowed to enter the section excepting only under the circumstances laid down in paragraphs Nos. 6, 15, 22, and 23.

12. Should it become necessary to block a section, in consequence of a break-down obstructing the line, or other circumstances taking place rendering it imperative that any approaching train should be stopped, the signalman at the station where the obstruction takes place must give six strokes on the bell twice, with a pause between (—●●●●●—●●●●●), and peg the indicator to "Train on line." The signalman receiving this signal must stop any approaching train.

Should there be reason to suppose that both lines are obstructed, the signalman must instantly give the "Imperative obstruction" signal in both directions, and put all his signals to danger.

13. To advise the station in advance that an approaching train is to be shunted for a following train to pass, the signal of seven strokes on the bell is to be given and acknowledged by an exact repetition.

14. If a signalman observes anything unusual in a train during its passage, such as signals of distress made by a passenger, goods falling off, a vehicle on fire, a hot axle-box, or other mishap, he must give the station in advance eight strokes on the bell (the signal to "Stop and examine train"), and the signalman at the station in advance must instantly put on the

danger signals to stop the approaching train, and acknowledge the eight strokes by repeating them.

Where practicable, the signalman must also telegraph the station in advance the cause of sending the "Stop and examine train" signal.

The signalman receiving this signal must also stop any train travelling in the opposite direction, and prevent it from entering the section until the other train has arrived, when he may allow it to proceed, having first satisfied himself that the line is clear.

15. Should a train or an engine pass a signal station without a tail-lamp on the last vehicle, it will be the duty of the signalman immediately to send to the signal-box in the rear nine continuous strokes on the bell, and to the box in advance the same number of strokes, but given thus:—●●●●—●●●●●, and to leave the indicator of the instrument pointing to "Train on line." The signalman at the box in advance, on receiving this signal, must acknowledge it and put on the danger signal to stop the approaching train, and tell the guard and driver of the intimation he has received. The signalman at the box in rear must acknowledge the signal and must stop the succeeding train, and warn the driver and guard that something may have become detached from the preceding train, as there was no tail signal on the last vehicle, and thereupon the train may be allowed to proceed cautiously to the next signal station, it being signalled as entering the section in the usual manner.

Upon the second train passing out of that section, complete, "Line clear" may be given, and the circumstance must be specially reported.

16. The "Approaching train separated" signal is only to be used in the event of a signalman observing that a train has become divided, and is running in two or more parts. The signalman receiving this signal must stop any train travelling in the opposite direction; and if the "separated train" is running on a falling gradient where the stoppage of the first part would risk a collision by the second part overtaking it, the signalman must not exhibit the danger signal to stop the first portion, but must give the driver a green signal either by flag or hand-lamp, waving such signal from side to side, and must endeavour to advise the driver of the circumstance as he passes; if the train is running on a rising gradient or where the line is level, the signalman must stop the first portion and deal with it as expeditiously as possible to prevent the second portion coming into collision with it.

Should any train going in the opposite direction have been stopped, it must not be allowed to proceed until satisfactory evidence has been obtained that the line on which it is about to run has not been obstructed.

17. At signal-boxes open during the day only, switches are provided to enable the stations on either side to be "put through" when the box is closed at night. The signalman on taking duty in the morning is to give notice to the stations he communicates with by 11 strokes on the bell (the opening or closing switch signal), which must be acknowledged by repetition, and he is then to set his indicators in accord with the signals exhibited on his instruments.

If a train is in transit at the time the switch is opened, the signalman must not give the "Line clear" signal until the train has passed the switch station, or "Line clear" has been signalled from the end of the section towards which the train was travelling.

When the time for leaving duty arrives, the signalman must not switch his apparatus out of circuit until the sections on each side are clear. When that is the case, the signal of 11 strokes may be given, and upon receiving the acknowledgment he may close the switch.

The times of opening and closing to be entered in the train register book.

(NOTE.—Signal-boxes having the means of communicating by speaking telegraph with the boxes on either side, must ascertain whether there are train

running on the sections before opening the block telegraph switch.

18. In the case of a signalman being aware of the fact of a portion of a train having become accidentally detached, or of a portion of a train running back down an incline, he must immediately place his signals for the opposite line to danger, and stop the next train going in that direction, and instruct the driver to proceed cautiously, as the line may be obstructed. He must also call the attention of the station in the rear towards which the portion of the train may be running, by giving 12 strokes on the bell, and leave the indicator of his instrument pointing to "Train on line." The signalman who has received this signal must stop any train about to proceed on the same line; and he must take such protective measures as may be necessary, such as turning the runaway train across to the other line or into a siding, as may be most expedient under the circumstances.

In the event of a train being turned across to the other line, the signal "Train running away forward on right line" must be passed on to the next signal-box.

19. If a train or engine has escaped without anyone on the engine, and is running away forward on the right line, the section in advance must be advised of the fact by giving 15 strokes on the bell in groups of three strokes repeated five times, a distinct pause to be made between each group of three, thus:—
 ●●●—●●●—●●●—●●●—●●●. The signalman receiving this signal must arrange for the line on which the vehicles are running to be cleared, and take such other measures as he may consider most expedient under the circumstances, and must also, if necessary, send the signal forward to the post in advance.

20. The Inspector's signal of 16 strokes on the bell, accompanied by the moving of the indicator from left to right, is only to be used by that person for testing and examining the instruments, and is to be acknowledged each time by an exact repetition. As soon as the examination of the instruments is completed, one stroke on the bell will be given by the inspector, which is to be acknowledged. This signal to be given only when the section is clear.

21. Signals which are slotted from another box must be tested as shortly after the signalmen change duty, as the running of the trains will permit. The signalman in charge of the slotted signal, after releasing the lever so far as he is concerned, will give 20 strokes on the gong (thus ●●●●—●●●●—●●●●—●●●●) to the signalman in the cabin, from which the signal is slotted. This must be repeated, and the distant signal lever worked three times slowly. Each signalman must make an entry in his train book of the transaction, and if the wire working the slot requires adjusting the signalman going off duty must walk to the signal-box and see it put right, unless he can get this done by sending a message on the speaking instrument. Slotted signals must not be tested after the "Be ready" has been received for a train on the line to which they refer.

22. In the event of any failure in the telegraphic communication preventing the necessary signals being forwarded and received, the signalman in charge of any block section may permit trains or engines to proceed over those sections of the line where the failure exists, provided he first brings the train or engine to a stand at the signal-box, and then advises the driver and guard of the failure; when this has been done, the train or engine may be allowed to proceed cautiously to the next post. No train must be allowed to follow another within five minutes; nor when a tunnel intervenes in a block section, within

ten minutes, unless the signalman on duty can satisfy himself that the tunnel is clear. So long as the telegraph failure continues, all subsequent trains or engines must be brought to a stand, and the drivers advised how long the previous train is in advance, and the nature of it.

Steps must be immediately taken to have the telegraphic apparatus put into working order again, and notice of the interruption must be given to the Telegraph Department in accordance with the instructions on this head.

23. To prevent delays to break-down van trains when proceeding to clear the line, they must in all cases be signalled as "Passenger trains," the signal "Shunt for fast train" being given whenever the sections in advance are occupied by trains which the break-down gang must pass to arrive at the scene of accident. In the event of the section not being immediately cleared, the break-down van train (after the driver has been warned by the signalman that a train is already in the section) must be allowed to proceed to the rear of the train or trains in advance, which must also proceed and be shunted at the first convenient crossing, to allow the break-down van train to pass. On reaching the section on which the accident has taken place the signalman in charge is to allow the break-down van train to enter the blocked section, after having first brought the engine to a stand, and having personally warned the driver of the nature and place of the obstruction, except single line working has commenced, in which case the train must wait for the pilotman.

In like manner, an engine proceeding to take the place of one that has failed, or an engine, with or without a train, when sent forward to render assistance in cases of failure or accident to preceding trains, may be allowed to enter the blocked section, after the engine has been brought to a stand and the driver has been warned of the circumstances.

24. Should any obstruction occur necessitating the working of single line (see Rule Book, pages 32 to 40), the officer in charge giving the necessary instructions for so doing is, at the same time, to give written instructions for suspending the working of the line by block telegraph. On the working of the double line being resumed, the order suspending the working of the line by block telegraph is to be cancelled by a written notice in the same manner and at the same time as the order for working single line is cancelled.

25. In case of accident to trains, or of the line being blocked by vehicles off the rails at or near to block telegraph boxes, the signalman must, in all cases, not only block back to the next adjacent signal-box as laid down in Rule 12, but also take steps to communicate by telegraph or by messenger to the nearest telegraph station, apprising the station-master thereof of the obstruction, in order that he may take steps to advise drivers of approaching trains of the occurrence, either by stopping them out of course or by telegraphing to the previous stopping station, in order that the station-master there may give them the needful warning.

For instructions regarding the working of signals see Rules Nos. 26 to 51d, and 88 to 102 in the Rule Book, dated August 19th, 1876.

GEORGE FINDLAY,
Chief Traffic Manager.

May, 1878.

Special instructions for this signal-box.—Must block back to Tipton for all trains coming off the Prince's End branch.

W. SUTTON,
District Superintendent.

Printed copies of the above report were sent to the Company on the 25th July.

LONDON AND SOUTH-WESTERN RAILWAY.

SIR, Board of Trade, (Railway Department,) 13, Downing Street, Whitehall, London, S.W., 14th July 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 3rd instant, that I have inspected the new station at Richmond, and have inquired into the circumstances connected with the accidents which are stated to have occurred at that station on the 8th and 26th of last March.

I gave notice of my intention to inspect this station, and to pursue this inquiry on the 9th instant, to the Clerk to the Richmond Vestry, to the two Railway Companies concerned, the London and South-Western and Metropolitan District, and to Mr. Heneage, the gentleman who was injured on the 8th March, and I was met at the station by the chairman (Colonel Burdett) and some members, and the Secretary of the Richmond Vestry, by the Officers of the two Railway Companies, and by Mr. Heneage and the son of the late Mr. King, who, it was stated, had met with an accident at this station on the 26th March, and who had died within 48 hours of its occurrence.

I may state at once with reference to this last accident, that it is admitted that Mr. King did not complain at the time when it occurred, and I was informed by the officers of the company that they knew nothing about any accident until afterwards, when the son came down to the station and mentioned that his father had met with an accident in getting out of a second-class carriage, and had fallen on to the platform, that he got up and walked home, and then mentioned what had taken place.

Description.

The Kensington and Richmond branch of the London and South-Western Railway was authorised to be opened for traffic in December 1868, and the new station at Richmond was designed as a terminal station with four separate platforms. These accidents occurred at No. 1, or the southmost platform; but the platforms are all practically alike as regards their height above the level of the rails, which varies from 1 foot 10½ inches to 2 feet, and which height was about 2 feet above the level of the rails where the accident occurred to Mr. Heneage on the 8th March last.

By the 38 & 39 Vict. Act, 1875, sections 43 and 44, the Metropolitan District Railway Company were granted running powers over the Kensington and Richmond branch, without any proviso being made as to the fitness of the company's rolling stock for the new line and station, and both accidents are stated to have occurred (to Mr. Heneage and to Mr. King) while in the act of getting out of a Metropolitan District second-class carriage.

These second-class carriages are all of one uniform width of 8 feet 6½ inches, as far as the body of the carriage is concerned; the floor stands about 4 feet 0½ inch above the level of the rails, and they are provided with one continuous footboard on each side of the carriage, fixed nearly midway between the level of the top of the platform and the level of the floor of the carriage.

This difference of level is about 2 feet 0½ inch. The outer edges of the continuous footboards project about 2 inches beyond the sides of the carriages, and thus a person in the act of getting out of one of these carriages has only a very narrow ledge of 2 inches in width, as a species of step, to assist him in stepping down from the floor of the carriage on to the platform. The continuous footboard is actually 10½ inches in width, but 8½ inches of that width is under the projecting body of the carriage. The width of the continuous footboard becomes available, whereon a foot may be placed, by a person in the act of getting into the carriage, but it can scarcely be called a step to assist a person in descending from the carriage to the platform on a dark night.

This platform is provided with seven gas lamps placed close to the fencing at the back of the platform.

Evidence.

A. F. Heneage, states.—I left Sloane Street station with a return ticket on Saturday the 8th March by the train leaving before half-past six, and arrived at Richmond station a few minutes before seven. I was in a second-class carriage in the front part of the train. On the train stopping I began to descend, and

was particularly careful in the act. It was so dark that I could not see the platform, and I put out my umbrella to feel it, and then my foot. While withdrawing my foot, and before I could get it on the platform I lost my balance from some cause to be afterwards explained, and I fell on my head and arm,

breaking it at the elbow joint, a bad fracture, and as my doctor says with a chance of a stiff joint for the remainder of my life. It is unfortunately my right arm. This accident is not only serious, but it incapacitates me from fulfilling my duties at Court this month, and later on, being in Her Majesty's household. I am convinced this accident would never have happened to me had the platform been sufficiently or even moderately lighted, and the steps for descent and ascent more conveniently placed. In proof of my state the doctor attending me can give a certificate, or the company can send their own medical officer. I am told that the platform is well lighted since the accident, but it certainly was not then, nor on other occasions, as I can bring many witnesses to prove. It was a very dark night, and the gas lamps gave only a very dull light, which was not a good light at the sides of the carriages. I could not see the platform. I do not remember what number of gas lights were burning on the platform on that night. I have constantly used this Richmond station. I think it was a dry night. I put out my right leg first, and I fell on my right side. The left arm was bruised. The right arm was broken. I maintain that the carriage was not in motion when I got out of the carriage, but it moved as I fell down.

John Rogers, head porter at Richmond station, two years, states.—I was on duty on the night of the 8th March, and I was on No. 1 platform when the Metropolitan District train, 6.4. p.m. from the Mansion House, arrived at the station. That train is due at 6.51 p.m., but I do not know at what time it arrived. It was a moonlight night, dry. All the gas lights on that platform were burning, and were turned full on. I was standing near the middle of the platform and I saw the train stop when it arrived at its proper place. The steam was off when the engine passed the east end of the platform. I saw the accident occur. I saw the gentleman fall on the platform, and the train was in motion when the gentleman fell, and the carriages ran forwards about four carriage lengths after the gentleman fell. The gentleman was riding in a second-class carriage at the front end of the train, but I cannot say whether he was riding in the first or second compartment. I did not open the door of the compartment. The gentleman had it open, and I called out "Wait until the train stops." When the gentleman fell I caught hold of him to prevent him from falling between the train and the platform. His hat fell between the train and the platform. The gentleman complained that his arm was hurt. I went with him to the company's inspector to get his name and address, and he gave his name and address to the inspector. There were some other porters on the platform, but I am not aware that any of them saw the accident. I called out to the gentleman to wait, but I did not take any active steps to prevent him from getting out. The guard of the train was not by me when I caught hold of the passenger to prevent him from falling between the train and the platform. The guard was in his van at the time the gentleman fell. The guard came up after I had got the gentleman upon his legs. I told the guard that the gentleman had fallen out of the train before it stopped, and the guard said he wanted his name and address, and he went also to the inspector with the gentleman and myself. The train did not stop and then move further on.

George Wm. Dover, station-master at Richmond two years, in the service of the London and South-Western Railway Company, states.—That there were seven gas lights burning on No. 1 platform on the night of the accident including that at the west end of the platform, that is the usual number, and it is the whole number of lights on that platform. I saw that those lights were burning shortly before the accident occurred. I did not see them burning at the time of the accident. I cannot call to mind seeing them afterwards. The lights are always turned fully on at all these lamps.

Walter A. King, son of Mr. Alfred King, who met with the accident on the 26th March, which ultimately caused his death, states.—That his father was travelling in a second-class Metropolitan District carriage in the 6.4 p.m. train from the Mansion House, and on his arrival at home he stated that he had had a slight fall which jarred him (age 59). The fall was caused by a jerk from the engine while he was in the act of getting out of the carriage. That it was from a jerk backwards. A medical man was called in the same evening. The coat which he wore on that occasion had dust on the left side. I believe he was not apparently hurt externally. He died on the 28th March. I came to the station on the 28th March, and made inquiries at the station of two porters whether they had seen any gentleman fall. I described the train, and they said they were not present at the time named.

Thomas Harris, engine-driver, eight years in the service of the Metropolitan District Railway Company, and 10 years previously as a cleaner and fireman on the Great Western Railway, states.—I was driving the 6.4 p.m. train from the Mansion House to Richmond on the 8th March last, and I left the Mansion House at 6h. 8m. p.m. My train was fitted with the Westinghouse break, but I cannot say whether breaks were fitted to all the vehicles or not. It was applied to the engine. I approached Richmond station very cautiously, having shut off the steam near about the distant-signal, and when I reached the east end of the platform I could not have been running more than four miles an hour. I had applied the break so as to reduce the speed to that rate. I make it a practice to apply the break when approaching a terminal station, so that I may be sure that it is in good working order, and it was so on that day. I stopped dead on that occasion, and the train did not move ahead at all after I had stopped, and the train was not moved until I had received orders from the shunter to shunt the train back clear of the points of the cross-over road when the engine was uncoupled, and I had then to draw ahead clear of the points which were then shifted, and to back the engine so as to get round to the other end of my train. I did not know that any accident had happened when I first backed the train. I backed it, but not quite far enough, and was told by the shunter to back it a little farther to enable the shunter to pick up the gentleman's hat which had fallen between the rail and the platform. After I had backed the train the second time I saw the shunter and another porter holding the gentleman, one on each side of him.

Mark Everett, fireman five years in the service of the Metropolitan District Railway Company, states.—I was fireman to Thomas Harris on the 6.4 p.m. train from the Mansion House to Richmond on the 8th March last. I am quite sure that the train when it reached Richmond station stopped dead, and did not after it had stopped move on again ahead; that the train did not move until it was backed to enable the engine to get round the train. I did not see the accident occur. It was a fine night, and the platform was lit with gas.

George York, head guard of the 6.4 p.m. train from the Mansion House to Richmond on the 8th March last, states.—That the train consisted of an engine and eight coaches, viz., two second-class carriages, two first, and four third-class carriages, and I rode in the last carriage. The train left nearly at the proper time, and reached Richmond a few minutes late. We ran into the station at about the usual rate, and when the train stopped it did not move on again. It pulled up as smoothly and as nicely as could be. I did not see the accident occur. When I first saw the gentleman he was standing up with his hat off. I did not notice where the hat was. We are due at Richmond at 6.51, and it might be 6.55 p.m. when we got there. Our trains are short buffered, and do not rebound sufficiently to throw a person down.

Alfred Seymour, under guard (12 months) of the 6.4 p.m. train from the Mansion House to Richmond on the 8th March last, states.—I rode in the carriage next to the engine. We ran into the Richmond station at about the usual rate, and when the train stopped it stopped dead, and did not move on nor back. I did not see the accident occur, but I saw the gentleman standing on the platform with no hat on, and a

lot of people round him. I do not know out of which carriage he fell. I saw a porter going down on the ballast to get the gentleman's hat after the train had been backed. The gentleman was standing nearly against the third-class carriages, which would be at the rear of the train; the second-class would be at the front of the train next the engine.

Conclusion.

From the preceding statements it appears that the accident to the late Mr. King occurred on the 26th March last, while he was in the act of descending from a second-class carriage of the 6.4 p.m. Metropolitan District passenger train from the Mansion House to Richmond; that he did not make any complaint respecting the accident when it occurred to any of the company's servants, but he mentioned what had happened when he got home, and his son went to the station two days afterwards to make inquiries, and could not learn that any of the company's servants knew that an accident had taken place. It also appears that no coroner's inquest was held to ascertain the cause of Mr. King's death on the 28th March.

As regards the accident which Mr. Heneage met with on the 8th March, it seems that he travelled from Sloane Square to Richmond by the Metropolitan District Railway Company's 6.4 p.m. train, due at Richmond at 6.51 p.m.; that he rode in a second-class carriage at the front part of the train, and fell on to the platform as he was in the act of getting out of that carriage, and fell on his right side, head, and right arm, breaking it at the elbow joint. He states that "he was particularly careful in the act of getting out of the carriage, that it was so dark that he could not see the platform, and he put out his umbrella to feel it, and then his right foot, and that while withdrawing his (left) foot, and before he could get it on the platform, he lost his balance." He maintains "that the carriage was not in motion when he got out of the carriage, but it moved as he fell down." He is convinced that "this accident would never have happened to him had the platform been sufficiently or even moderately lighted, and the steps for descent and ascent more conveniently placed."

There is apparently no doubt that the train moved forward after Mr. Heneage had got his foot on the platform, as, when he was picked up by the company's servants, he was opposite to the leading third-class carriage, which is placed immediately behind the two first-class carriages that followed the two second-class carriages at the front part of the train, in one of which he was riding. But the evidence is conflicting as to the train having stopped, and then having again moved forward before it finally stopped.

The only person who witnessed the accident (the head porter or shunter Rogers) distinctly states that the train did not stop and then again move forward, and his statement is corroborated by that of the engine-driver and fireman and the two guards of the train. Other cases have, however, come before me where passengers have stated that they were unaware that the train was still in motion when they attempted to get out of a carriage. I cannot pretend to say what was the fact on this occasion, but I have no doubt that the means provided on the Metropolitan District Railway carriages for getting out on a dark night of a carriage whose floor stands 4 feet and $\frac{1}{2}$ an inch above the level of the rails, on to the platform of Richmond, which is not more than 2 feet above the same level, by means of a projecting continuous footboard, whose outer edge does not extend more than 2 inches outside the side of the carriage, might have had a great deal to do with causing the accident; the surface of this footboard being $12\frac{1}{2}$ inches below the floor of the carriage.

As I was the Officer of the Board of Trade who inspected the Kensington and Richmond branch of the London and South-Western Railway before it was authorised to be opened for public traffic in December 1868, I beg to call your attention to the enclosed extract from the proceedings of the Richmond Select Vestry Meeting which appeared in a local newspaper, in which Mr. Smallman stated that "he felt strongly that if the Board of Trade had charge of our railways they never should have allowed the District carriages to enter a station so unfit for the passengers safety, and thereby laid themselves open to severe public censure," and on this remark I may observe that the new Richmond station, as regards the height of its platforms when it was opened for traffic corresponded with the height of the platforms as constructed at the greater portion of the London and South-Western Railway Company's stations, their standard height at that time being about 1 foot 9 inches, and that the new Richmond

station was not designed to accommodate carriages similar to those now in use on the Metropolitan District Railway.

The Legislature has not given the Board of Trade power to say what kind of carriages shall be used on any of the railways throughout the United Kingdom, as regards their height, width, length, or what provision should be made to enable the passengers to enter and leave the carriages with convenience and in safety.

The proper remedy for the existing dangerous state of things at the new Richmond station is for the Metropolitan District Railway Company to discontinue running carriages similar to those in use when the accidents occurred, or for the railway companies concerned to make arrangements for raising the platforms, so as not to leave a step of 2 feet 0½ inch in height between the level of the floor of the carriage and that of the platform; but the Board of Trade are not empowered to make any order on the subject, as regards the height of the platforms on a line which has long been authorised to be opened for public traffic, nor with respect to the particular construction of the carriages which are to be used on these lines.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

APPENDIX.

EXTRACT from a Local Newspaper of the Proceedings
of the Richmond Select Vestry Meeting.

Dangers at Richmond New Station.

Mr. Smallman said that he had put a notice on the paper to call attention to the District Railway carriages and the platform at the new station. The direct motive he had in bringing the subject before the vestry had arisen from an accident which occurred last Wednesday week, to a neighbour of his, residing in Church Road, and, he believed, a season-ticket holder and regular passenger between Richmond and the Mansion House station. Returning on that evening, he fell from the carriage to the platform. He sat quite still until the train stopped, but when about to step out a slight reaction or jerk threw him out of the carriage to the platform, a distance of, he supposed, more than 2 feet. On reaching home he mentioned the accident, and said he felt that he had had a great shock. He went to bed immediately, but at once became insensible, and died in 48 hours. He felt strongly that if the Board of Trade had charge of our railways they never should have allowed the District carriages to enter a station so unfit for the passengers safety, and thereby laid themselves open to severe public censure. He would move—

“That the attention of the Board of Trade be called to the recent accident and the previously reported cases of serious injuries which have occurred to passengers whilst alighting at the Richmond new station from the carriages of the District Railway Company, owing to the mal-construction of the platforms in use by that company in their passenger traffic to and from the Richmond station.”

The chairman quite endorsed all that Mr. Smallman had said, and added that only the week before last a gentleman living at Twickenham fell from a train at the Richmond new station, and broke his arm. Mr. Carless said that at Shaftesbury Road the South-Western Railway Company had raised the platform to the necessary height, and if this were done at Richmond it would suit the South-Western trains as well as those of the Metropolitan and District Companies. He thought the South-Western Company were quite as much to blame for their platforms as the District Company for their carriages. Mr. Sims thought the platforms should be raised. A man who was recently in his employment, and would be now if he were able to work, was thrown out of one of the District carriages, and had been laid up for nearly a fortnight with a sprained foot. Any old woman at the workhouse could have designed better and more convenient stations than those at Richmond. Even the old station — would anyone suppose that an engineer with any brains about him at all could have designed such a station? From some of the carriages at the new station they had to step down from 2 feet 6 inches to 2 feet 10 inches. Mr. Noyce said that on the previous day he saw a lady who had to sit down on the floor of one of the South-Western carriages before she could reach the platform. After some further discussion the following amendment was adopted:

“That the attention of the Board of Trade be called to the recent reported and other accidents which have occurred to passengers whilst alighting at the Richmond new railway station, with a request that the Board will inquire into the same, and take such measures as they may think fit.”

Printed copies of the above report were sent to the London and South-Western and the Metropolitan District Railway Companies on the 26th July.

COPY of CORRESPONDENCE between the RICHMOND VESTRY and the BOARD of TRADE relative to ACCIDENTS that have taken place at the RICHMOND NEW STATION, and between the BOARD of TRADE and the LONDON and SOUTH-WESTERN RAILWAY COMPANY relative to their not having reported these ACCIDENTS, and certain others that have occurred on their Railway.

No. 1.

CLERK to the RICHMOND VESTRY to the BOARD of
TRADE.

Vestry Clerk's Office,

Richmond, Surrey,

16th April 1879.

SIR,

I BEG to forward to you, by direction of the

Richmond Vestry, the urban authority of this parish, a copy of a resolution which was passed at a general meeting of that body on the 8th instant.

“Resolved, nem. con., that the attention of the Board of Trade be called to the recent reported and other accidents which have occurred to passengers whilst alighting at the Richmond new railway station, with

a request that the Board will inquire into the same, and take such measures as they may think fit."

I have, &c.,

FREDK. B. SENIOR,

Thos. H. Farrer, Esq.,
Secretary,

Vestry Clerk.

Board of Trade, London.

No. 2.

The BOARD of TRADE to the CLERK to the RICHMOND VESTRY.

Board of Trade,
(Railway Department,) London, S.W.,

18th April 1879.

SIR,

I AM directed by the Board of Trade to acknowledge the receipt of your letter of the 16th instant, transmitting a copy of a resolution passed at a general meeting of the Richmond Vestry on the 8th instant, relative "to the recent reported and other accidents which have occurred to passengers whilst alighting at the Richmond new railway station."

In reply I am to state that as the London and South-Western Railway Company have not reported any accidents as having taken place at Richmond station during the last two years, the Board of Trade have no information as to the accidents to which you allude, and are consequently unable to take any action. If, however, the vestry will favour this Department with the details of the accidents to which they refer, the Board of Trade will at once comply with the request contained in the resolutions forwarded by you.

I am, &c.,

HENRY G. CALCRAFT.

F. B. Senior, Esq.,
Vestry Clerk,
Richmond, Surrey.

No. 3.

CLERK to the RICHMOND VESTRY to the BOARD of TRADE.

Vestry Clerk's Office,
Richmond, Surrey,
28rd April 1879.

SIR,

I BEG to acknowledge the receipt of your letter of the 18th instant, stating that the London and South-Western Railway Company have not reported any accidents as having taken place at Richmond station during the last two years, and asking for the details of the accidents to which the vestry refer in my letter to you of the 16th instant, and in reply I beg to inform you that there will be no meeting of the vestry until the 6th May next, when your letter shall be laid before them.

I am, &c.,

F. B. SENIOR,

Vestry Clerk.

The Secretary,
Board of Trade,
(Railway Department,) London, S.W.

No. 4.

CLERK to the RICHMOND VESTRY to the BOARD of TRADE.

Vestry Clerk's Office,
Richmond, Surrey,
13th May 1879.

SIR,

YOUR letter of the 18th ultimo acknowledging the receipt of a copy of a resolution of the vestry passed on the 8th ultimo, relative to the recent reported and other accidents which have occurred to passengers whilst alighting at the Richmond new railway station, and stating that as the London and

South-Western Railway Company have not reported any accidents as having taken place at the Richmond station during the last two years, your Board have no information as to the accidents to which the resolution of the vestry alludes, and asking the vestry to give such details, was laid before the vestry at their meeting held on the 6th instant, when a resolution was passed directing me to obtain the required information and forward the same to you, and in accordance therewith, I beg to forward you the following information which has been given to me : 1st, I am directed to refer you to the case of Mr. Foulkes who has recently obtained 500*l.* damages against the Company in respect of injuries received at Richmond new station; 2ndly, to refer you to the case of Mr. Heneage of Twickenham who fell out of a carriage on to the platform at the new railway station at Richmond, and broke his arm; and 3rdly, the case of Mr. Alfred King, late of No. 75, Church Road, Richmond, who on the 26th of March last was a passenger by the District Railway, and on reaching Richmond new station met his death in alighting from the carriage thereat.

I am, &c.,

H. G. Calcrafft, Esq.,
Board of Trade,

(Railway Department,) London, S.W.

FREDK. B. SENIOR,
Vestry Clerk.

No. 5.

The BOARD of TRADE to the CLERK to the RICHMOND VESTRY.

Board of Trade,
(Railway Department,) London, S.W.,

23rd May 1879.

SIR,

I AM directed by the Board of Trade to acknowledge the receipt of your letter of the 13th instant, furnishing particulars of three accidents that have occurred during the last two years at the Richmond new station, and to acquaint you that they are in communication with the London and South-Western Railway Company on the subject.

I am, &c.,

HENRY G. CALCRAFT.

The Vestry Clerk,
Richmond, Surrey.

No. 6.

The BOARD of TRADE to the SECRETARY to the LONDON and SOUTH-WESTERN RAILWAY COMPANY.

Board of Trade,
(Railway Department,) London, S.W.,

21st May 1879.

SIR,

I AM directed by the Board of Trade to acquaint you that their attention has been called to three accidents to passengers that have occurred during the last two years at the Richmond new station, viz. :—

1st. The case of Mr. Foulkes who has recently obtained judgment for damages against the company for injuries received.

2nd. The case of Mr. Heneage, of Twickenham, who, when alighting from a train, fell on to the platform and broke one of his arms.

3rd. The case of Mr. Alfred King, of Richmond, who, on the 26th of March last, when alighting from a District Company's train, fell and was fatally injured.

The Board of Trade have also been informed of two other accidents which have occurred on the London and South-Western Railway, viz., one to an engine-driver named Thomas Hele, who on the 25th of October last was caught between two engines at the Nine Elms station, and whose injuries terminated fatally on the 11th ultimo. The other to a passenger

named Decker, who when attempting to enter a carriage at Clapham junction, on the 15th ultimo, fell between the train and platform.

As none of these accidents have been reported to this Department, as required by the Regulation of Railways Act, 1871, the Board of Trade direct me to request that the directors of your Company will, without delay, state any reasons they may have to urge why summary proceedings should not be taken by the Board of Trade to recover the penalties provided for non-compliance with the provisions of the Act above referred to.

I am, &c.,
HENRY G. CALCRAFT.

The Secretary to the
London and South-Western
Railway Company.

No. 7.

The SECRETARY to the LONDON and SOUTH-WESTERN
RAILWAY COMPANY to the BOARD of TRADE.

LONDON AND SOUTH-WESTERN RAILWAY.

Secretary's Office,
Waterloo Bridge Station, S.E.
May 22nd, 1879.

SIR,

I BEG to acknowledge the receipt of your letter of the 21st inst., which shall have attention.

I am, &c.,
FRED. J. MACAULAY,
Assistant Secretary.

The Assistant Secretary,
(Railway Department),
Board of Trade.

No. 8.

The SECRETARY to the LONDON and SOUTH-WESTERN
RAILWAY COMPANY to the BOARD of TRADE.

LONDON AND SOUTH-WESTERN RAILWAY.

Secretary's Office,
Waterloo Bridge Station, S.E.
May 30th, 1879.

SIR,

IN reference to your letter of the 21st May, acquainting me that the attention of the Board of Trade has been called to three accidents to passengers that have occurred during the last two years at the Richmond New Station.

Also as to two other accidents which have taken place on the London and South-Western Railway, and which, together with the three accidents above referred to, have not been reported to the Board of Trade, and requesting that the directors of this Company will state if they have any reasons to urge why summary proceedings should not be taken by the Board of Trade to recover the penalties provided for non-compliance with the provisions of the Regulation of Railways Act, 1871.

I am instructed to state in respect to the three first named cases, that it was not considered the duty of this Company to report them, they all having occurred to passengers when travelling by trains of the Metropolitan District Railway Company, and in their carriages, under the charge of their servants; and in respect of the third accident mentioned, viz., that to Mr. King, this Company has no knowledge.

As regards the other two cases. The engine-driver "Hele," who was hurt at the coal stage, in the locomotive yard at Nine Elms on the 25th October last, was reported to be but slightly hurt, and it was hoped would be in a condition to resume his work in a short time, so it was not considered necessary to report the occurrence. No information has been received here as to his decease in April last.

In the case of Mr. Decker, who fell in his attempt to enter a train at Clapham junction, as damage to his clothing was reported to be the principal result of his

own folly (the train not having stopped), it was not deemed an accident coming under the category of a railway accident attended with personal injury.

I am, &c.,
FREDERICK CLARKE,
Secretary.

The Assistant Secretary,
(Railway Department),
Board of Trade.

No. 9.

The BOARD of TRADE to the SECRETARY to the
LONDON and SOUTH-WESTERN RAILWAY COMPANY.

Board of Trade,
(Railway Department),
London, S.W.,
23rd June 1879.

SIR,

I AM directed by the Board of Trade to acknowledge the receipt of your letter of the 30th ult., offering some explanation why the London and South-Western Railway Company had neglected to report to the Board of Trade, as required by the provisions of the Regulation of Railways Act, 1871, certain accidents which had occurred upon their line.

In your letter you state that as regards the accidents to which the Board of Trade directed your attention as having occurred at Richmond New Station, "it was not considered the duty of the London and South-Western Railway Company to report them, they all having occurred to passengers when travelling by trains of the Metropolitan District Railway, in their carriages, under the charge of their servants."

The Board of Trade cannot accept this explanation as satisfactory, as it was the duty of your Company to make themselves acquainted, and to comply with the provisions of the law in these respects.

In order, however, to prevent any possible misapprehension upon this point, the Board of Trade had directed the attention of your Company, by a circular of the 26th October 1871, to the provisions of the Regulation of Railways Act, 1871, in which the 6th section of the Act is quoted in full. That section enacts that where in or about any railway, or any of the works or buildings connected with such railway, occupied by the Company working such railway, any accident attended with loss of life or personal injury to any person whomsoever takes place, the Company working such railway shall send notice of such accident to the Board of Trade.

The attention of the Company was again called to the requirements of the law in these matters on the 18th November 1874, when an Order of the Board of Trade made under the provisions of the Act above referred to was sent to your Company, and again on the 10th September 1878 the attention of your Company was particularly directed to the fact that by the Act of 1871 it is made obligatory upon railway companies to make returns of any accident attended with personal injury to any person whomsoever, which may happen upon their railway. This letter was written to your Company in reference to an accident which had occurred on the 27th July 1878, to two passengers at the Wimbledon station.

After such repeated warnings the London and South-Western Railway Company must have been well aware of what they were required by the law to do, and the reasons stated in your letter are, the Board of Trade regret to say, not sufficient to satisfy them that they would be justified in abstaining from instituting summary proceedings for recovering the penalties provided for non-compliance with the provisions of the Act of 1871.

With regard to your observations in the case of the engine-driver "Hele," I am to point out to you that the Company was in no way relieved from the responsibility of reporting the accident, as the Act does not specify the degree of personal injury that is to be reported to the Board of Trade, nor does it

excuse a Company from making a return of an accident even if the injury is very slight.

Since the receipt of your letter of the 30th ult., the attention of the Board of Trade has been called to the omission on the part of your Company to report a landslip that had taken place on the London and South-Western Railway near the Meldon Viaduct, Okehampton. By neglecting to report this accident the Company have also made themselves liable to a penalty.

In these circumstances the Board of Trade direct me to request that you will call the very serious attention of your directors to this letter.

The facts disclose such a large departure from the requirements of the law, that the Board of Trade fear that the accidents to which their attention has been called are not all that the Company have failed to report, and it reveals a system so objectionable and untrustworthy, that they have no alternative but to place the matter in the hands of their solicitor.

The Board of Trade greatly regret to be compelled to take this step, but in the absence of any sufficient explanation for the past neglect of the Company to comply with the provisions of the law, and without any assurance that in future proper precautions will be taken for complying with the Act, they are unable in the interests of the public to take any other course.

I am, &c.,

HENRY G. CALCRAFT.

The Secretary of the
London and South-Western
Railway Company.

No. 10.

The SECRETARY to the LONDON and SOUTH-WESTERN
RAILWAY COMPANY to the BOARD of TRADE.

LONDON AND SOUTH-WESTERN RAILWAY.

Secretary's Office,
Waterloo Bridge Station, S.E.,
June 24th, 1879.

SIR,

I BEG to acknowledge the receipt of your letter of the 23rd inst., on the subject of certain accidents mentioned therein not being reported to the Board of Trade, which shall be laid before the directors.

I am, &c.,

The Assistant Secretary,
(Railway Department),
Board of Trade.

FREDK. CLARKE,
Secretary.

No. 11.

The BOARD of TRADE to the CHAIRMAN of the
LONDON and SOUTH-WESTERN RAILWAY COMPANY.

Board of Trade,
London, S.W.,

MY DEAR SIR, 1st July 1879.

MR. TALBOT and myself have carefully considered the representations which you made at the interview which I had with you this day, with reference to the neglect on the part of the London and South-Western Railway Company to report several accidents which have occurred on their railway, as required by the Regulation of Railways Act, 1871.

Although it is, as I pointed out to you, a matter of the greatest importance, not only to ensure the accuracy of the statistical returns on this subject, but also in connection with the safety of the travelling public, that the Act in this matter should be rigidly adhered to; and although there cannot be, I fear, any doubt that there has been considerable laxity in reporting these accidents, yet, after the very ample assurance which you made to-day on behalf of your Company, we have come to the conclusion that we should be justified in abstaining from legal proceedings, if we receive from your company a letter to the following effect:

In the first place, the letter should admit the neglect of your Company to report the accidents which

happened to Mr. Foulkes, Mr. Heneage, driver Hele, Mr. King, and Mr. Deeker, and the landslip at Okehampton; there should be a most ample assurance that in future proper precautions will be taken for complying with the Act; and a proposition to pay the expenses which the Board of Trade have been put to in connection with the summonses which have been issued.

Upon receiving such a letter, I shall be prepared to give directions for staying all further legal proceedings; but shall consider it necessary, as in the case of another railway company a few years ago to lay the whole of the correspondence before Parliament.

Believe me, &c.,

SANDON.

The Hon. Ralph Dutton,
Chairman of the London and
South-Western Railway Company.

No. 12.

The CHAIRMAN of the LONDON and SOUTH-WESTERN
RAILWAY COMPANY to the BOARD of TRADE.

LONDON AND SOUTH-WESTERN RAILWAY.

Secretary's Office,
Waterloo Bridge Station, S.E.,
2nd July 1879.

MY LORD,

I HAVE the honour to acknowledge and to thank you for your letter of 1st July, and beg to repeat the assurance I gave you that any laxity in reporting accidents has not been with the knowledge of my board, and they much regret that the terms of the Act of Parliament have, through a misunderstanding, not been acted upon.

I therefore on the part of this Company admit neglect in not having reported the accidents which happened to Mr. Foulkes, Mr. Heneage, engine-driver Hele, Mr. King, and Mr. Deeker, and also the slip of rock near Okehampton, where the doubling of the line is in progress; and now give the most ample assurance that in future proper precautions will be taken for complying with the Act in its strictest meaning.

This Company will also be prepared to pay the expenses which the Board of Trade have been put to in connection with the summonses which have been issued.

I am, &c.,

RALPH DUTTON.

The Lord Sandon,
&c. &c.,

Board of Trade.

No. 13.

The BOARD of TRADE to the SECRETARY to the
LONDON and SOUTH-WESTERN RAILWAY COMPANY.

Board of Trade,
(Railway Department),
London, S.W.,

SIR,

I AM directed by the Board of Trade to acknowledge the receipt of the Hon. Mr. Dutton's letter of the 2nd instant, expressing regret that the terms of the Regulation of Railways Act, 1871, have, through a misunderstanding, not been acted upon by the London and South-Western Railway Company, and giving ample assurance that in future proper precautions will be taken for complying with the Act in its strictest meaning.

In reply I am to acquaint you that, in consideration of such explanation and assurance, the Board of Trade have given instructions that all legal proceedings against the Company on this matter should be withdrawn. Their solicitor will communicate with you as to the costs which have been incurred.

I am at the same time to request that you will forward to this Department, with as little delay as possible, a return of any accidents which may have

occurred upon the London and South-Western Railway, either personal or otherwise, during the present year, which the Company may have failed to report.

I am also to transmit to you a copy of the correspondence* that has taken place between the Vestry of Richmond and the Board of Trade, relative to certain accidents that have happened to passengers at the Richmond new station, and to inform you that Colonel Yolland has been appointed to inspect the station, and to inquire into and report upon the accidents referred to.

Colonel Yolland will communicate with you on this subject.

I am, &c.,
HENRY G. CALCRAFT.

The Secretary to the London
and South-Western Railway Company.

No. 14.

THE SECRETARY to the LONDON and SOUTH-WESTERN
RAILWAY COMPANY to the BOARD of TRADE.

LONDON AND SOUTH-WESTERN RAILWAY.

Secretary's Office,
Waterloo Bridge Station, S.E.,
4th July 1879.

SIR,

I HAVE to acknowledge the receipt of your letter of the 3rd July, acquainting me that all legal proceedings against this Company shall be withdrawn in consequence of the assurances contained in the letter of the Hon. Mr. Dutton of the 2nd instant, at the same time requesting that returns of any accidents which may have occurred on this line, personal or otherwise, during the present year, and which may have been overlooked, shall now be sent in.

I have also to acknowledge the receipt of correspondence between the vestry of Richmond and the Board of Trade as to certain accidents which have happened to passengers at the Richmond new station, which Colonel Yolland has been appointed to inquire into and report upon.

Your letter and the enclosures shall be laid before the board at the next meeting.

I am, &c.,
The Assist. Secretary, FREDERICK CLARKE,
(Railway Department,) Secretary.
Board of Trade, Whitehall.

No. 15.

THE BOARD of TRADE to the CLERK to the RICHMOND
VESTRY.

Board of Trade,
(Railway Department,)
London, S.W.,
3rd July 1879.

SIR,

REFERRING to previous correspondence relative to certain accidents to passengers at the Richmond new station, I am directed by the Board of Trade to acquaint you that they have appointed Colonel Yolland to inspect the station and to inquire into and report upon the accidents in question.

I am, &c.,
HENRY G. CALCRAFT.

The Clerk to the Vestry
of Richmond, Surrey.

No. 16.

THE BOARD of TRADE to the SECRETARY to the
LONDON and SOUTH-WESTERN RAILWAY COMPANY.

Board of Trade,
(Railway Department,)
London, S.W.,
25th July 1879.

SIR,

I AM directed by the Board of Trade to transmit to you, to be laid before the Directors of

your Company, the enclosed printed copies (12) of the Report made by Colonel Yolland, the officer appointed by the Board of Trade to inquire into the circumstances connected with the accidents stated to have occurred to two passengers by the Metropolitan District Railway Company's trains at the new station, Richmond, on the 8th and 26th of March last respectively.

I am, &c.,
HENRY G. CALCRAFT.

The Secretary to the
London and South-Western
Railway Company.

No. 17.

THE BOARD of TRADE to the CLERK to the RICHMOND
VESTRY.

Board of Trade,
(Railway Department,)
London, S.W.,
25th July 1879.

SIR,

I AM directed by the Board of Trade to transmit to you, for the information of the Richmond Vestry, the accompanying copies of the Report made by Colonel Yolland of the result of his inspection of the new station at Richmond, and his inquiry into the circumstances connected with the accidents stated to have occurred at that station on the 8th and 26th of March last.

I am, &c.,
HENRY G. CALCRAFT.

The Clerk to the Vestry
of Richmond, Surrey.

No. 18.

THE BOARD of TRADE to the SECRETARY to the
METROPOLITAN DISTRICT RAILWAY COMPANY.

Board of Trade,
(Railway Department,)
London, S.W.,
25th July 1879.

SIR,

I AM directed by the Board of Trade to transmit to you, to be laid before the Directors of your Company, the enclosed printed copies (12) of the Report made by Colonel Yolland, the officer appointed by the Board of Trade to inquire into the circumstances connected with the accidents stated to have occurred to two passengers by the Metropolitan District Railway Company's trains at the new station, Richmond, on the 8th and 26th of March last respectively.

I am, &c.,
HENRY G. CALCRAFT.

The Secretary to the
Metropolitan District
Railway Company.

No. 19.

THE SECRETARY to the LONDON and SOUTH-WESTERN
RAILWAY COMPANY to the BOARD of TRADE.

London and South-Western Railway,
Secretary's Office,
Waterloo Bridge Station, S.E.,
8th August 1879.

SIR,

IN accordance with the request contained in your letter of 3rd ultimo (R. 6235), I now beg to forward you the enclosed (41) returns of accidents which have occurred on this line of railway during the present year, and which it was not at the time considered necessary to report to the Board of Trade.

I am, &c.,
FRED. CLARK,
Secretary.

The Assistant Secretary,
(Railway Department,)
Board of Trade.

* Vide Nos. 1 to 5 inclusive, and No. 15.

No. 20.

The GENERAL MANAGER of the LONDON and SOUTH-WESTERN RAILWAY to the BOARD of TRADE.

LONDON AND SOUTH-WESTERN RAILWAY.

General Manager's Office,
Waterloo Bridge Station, S.E.,
London, 9th August 1879.

SIR,

YOUR letter to the Secretary of 25th July with Colonel Yolland's Report upon accident stated to have occurred to two passengers by the Metropolitan District Company's trains at the new station, Richmond, on the 8th and 26th March last, have been under the consideration of the directors.

I am instructed to state that this Company is ready, in conjunction with the District and the Metropolitan Railway Companies whose trains use the Richmond

new station, to raise the height of the platforms at that station.

I am instructed to add that a considerable time ago this Company formally objected to the description of carriages used on the District Company's trains running to Richmond as being unsafe, inasmuch as there is no available step for the use of passengers. These carriages are unlike those in use upon any railway, not even excepting the Metropolitan Railway.

My directors at same time proposed to raise the height of the platforms at the stations between Shaftesbury Road and Richmond inclusive, which are used by the trains of the District Company, provided that Company agreed to pay a fair share of the expenditure, but this the District Company declined.

I am, &c.,

ARCHD. SCOTT.

The Assistant Secretary,
(Railway Department,)

Board of Trade, Whitehall, S.W.

LONDON, BRIGHTON, AND SOUTH COAST RAILWAY.

Board of Trade (Railway Department),

SIR,

13, Downing Street, London, S.W., 19th June 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 31st ultimo, the result of my inquiry into the circumstances connected with the collision which occurred on the 26th ultimo, at Brighton station, on the London, Brighton, and South Coast Railway.

In this case, the 8.30 a.m. passenger train, (consisting of a tank engine, running coal-bunk first, and eight vehicles, of which the first was a break van, and the last a third-class break-carriage,) from Hayward's Heath to Brighton, where it was due at 9.20 a.m., came into collision with the buffer stops at Brighton station.

Seventeen complaints of injury have been received.

In the engine the head was broken off one of its buffers, and the front of the tool box was damaged. The bodies of four vehicles were shifted on their frames, and a buffer socket was broken.

The buffer stops with which the engine came in collision were broken, and a cast-iron girder, over a cab approach underneath the line of rails on which the train was running, was cracked across the centre.

Description.

Brighton station is approached from Preston, the next station towards Hayward's Heath, $1\frac{1}{4}$ miles from Brighton, on a falling gradient of 1 in 264, which terminates 620 yards from the buffer stops, the line being level for these 620 yards. The distance of the different points alluded to in the evidence from the buffer stops are—

Overbridge	-	-	1,280 yards.
Lover's Walk cabin	-	-	1,060 "
Montpelier cabin	-	-	610 "
North end of ticket platform	-	-	500 "

The traffic is worked on the absolute block system.

The following rule applies to trains entering terminal stations:—"Drivers and guards in charge of trains must approach all terminal stations with great care, having their trains well under control; and on reaching the points and crossings of each terminal station, the speed must not exceed five miles per hour. Each train must be brought to a stand short of the stop buffers, or any carriages and vehicles which may be standing on the platform siding. A vigilant look-out must be kept by the drivers and guards on entering the platform sidings, to see how far such sidings are clear, and regulate their speed accordingly."

The engine drawing the train weighed 38 tons.

Evidence.

1. *Henry Anscombe*, station-master five years at Brighton.—I was on the middle platform when my attention was directed to the train from Hayward's Heath, the engine of which was then about 100 yards

from the buffer stops of the Hastings arrival line. The speed appeared to me unusually high; I made the remark that the driver had on the air break and would be sure to stop. I watched the progress of

the engine, the speed of which I think was seven to eight miles an hour when he struck the stops; 10 or 12 yards before the buffer stops I noticed steam put on. I then ran round at once to the train. The rails along the platform line were dry.

2. *George Faulkner*, head porter at Brighton three years.—I was on the centre platform when I observed the engine of the Hayward's Heath train passing the up end of the platform. When I first saw it I did not observe the speed as being particularly fast, but, on reaching the London arrival platform, when the engine had just got past me, I thought the speed was too fast, 12 miles an hour. It then slightly diminished until the engine struck the buffer stops. By the time I reached the platform at which the train stopped, the last carriage had just passed me, and I observed that the guard's breaks were on and that the guard was in the act of taking an additional turn at the wheel. Some passengers jumped out before the train stopped, but I saw no one tumble down. There was very little rebound after the train stopped. The rails were perfectly dry.

3. *Thomas Siver*, seven years passenger guard and 27 years in the service.—Before starting from Hayward's Heath I had made a previous trip from Brighton to Hayward's Heath with the same engine and train. The train consisted of eight vehicles, with a van at one end and break compartment at the other. Nothing went wrong on the journey from Brighton, and we started back punctually at 8.30 a.m. We were a minute late leaving Burgess Hill, and at Preston we arrived at right time, 8.54, and left it nearly a minute before time by the private working time table, viz., 8.58; the station-master having said there was no one coming, and the public working time table showing 8.58. We had overrun none of the stations in the least up to this time. I had used my break in making the stops, but whether the driver had used the air break on the engine I cannot say. I am in the habit of travelling with this driver and from my observation I should say he was in the habit of using his air break for ordinary stops, though I could not speak as to this on the morning in question. We are allowed three minutes for running the $1\frac{1}{4}$ miles from Preston to Brighton. We started as usual from Preston, and there was nothing unusual to attract my attention up to the time steam was shut off at Lover's Walk junction, when I think it was not much more than 11 miles an hour. I stood in readiness to apply my break and I put it on hard as the train passed over the points leading to the Hastings arrival line, when I thought the train was running faster than it ought to be, the speed not having diminished since steam was shut off. After this I never released my break, but screwed it tight on and held it till we struck the buffer stops at a speed I do not think less than eight or nine miles an hour. The collision knocked me from the wheel, but I did not tumble down and was not hurt. I thought there was a slight increase of speed as we passed over the facing-points at Montpelier junction. I felt no effect from the driver's reversing. I was alone in the break compartment. I did not hear the driver whistle for the breaks. There was at least 150 passengers in the train. I made the time of the accident 9.1, i.e., three minutes from Preston, though I had previously entered 9.2 in the driver's return, judging from the signals being off that we should have arrived at that time.

4. *John Howells*, driver 13 years on the London,

Brighton, and South Coast Line, and six years on other lines.—I was driving tank-engine "Osborne" on the 26th, which I have driven for about 15 months. The breaks were in good order, and had been on about three weeks; there was one to each of the six wheels. There is a Westinghouse break on the engine, this was also in working order, but I had not used it at all on the morning of the accident, either on the journey to or from Hayward's Heath. I have no orders not to use it, and I am acquainted with the mode of working it; but the train was a light one, consisting of only eight vehicles, the usual size of the trains between Hayward's Heath and Brighton. Fireman Ford was on the engine with me; he has worked with me regularly for eight or nine months. Nothing went wrong on the journey from Brighton to Hayward's Heath; we overran no platforms. We started back punctually at 8.30, the engine now running bunk first. We kept time at the different stations up to Preston, and overran no platform. We started from Preston about right time, three minutes being allowed for the run, which is rather over a mile. I shut off steam a short distance north of the new bridge near Lover's Walk, about the usual place; the signals were off for running in. My speed was not more than 18 to 20 miles an hour, the highest speed I had attained. I saw the fireman apply his break a short distance past the Lover's Walk signal-cabin, the usual place; the speed then appearing to diminish, he eased off the break (after passing through the points) at the ticket platform, and then the speed appearing to increase he again put it on at the end of the ticket platform, still without my telling him. I had no idea we were going too fast till we were more than half-way up the platform, but then the speed seemed to increase, although the break was tight on, and I accordingly reversed and put on steam against the engine. I did not whistle for the guard's breaks, having hardly time; notwithstanding these efforts to reduce the speed, we struck the buffer stops at a speed of four miles an hour. Neither I nor the fireman jumped off, and we did not feel anything of the blow. I could not say whether the guard's breaks were properly applied. The rails were dry, except at the end of the shed, where they were a little damp. I have never run into the stops before, though I have run into the station some hundreds of times, and I cannot account for the present accident.

5. *Clifford Ford*, fireman five years.—I have worked about six months with Howells. Nothing went wrong on the journey out from Brighton to Hayward's Heath. I used my hand-break for stopping the train, and on the return journey I did the same, the Westinghouse break not having been employed. Nothing at all went wrong from Hayward's Heath to Preston. Steam was shut off just the other side of the new bridge, when the speed was as usual, I cannot say what rate. I put my break on soon after passing Lover's Walk box, the same place as usual, and the speed decreased. I then eased the break on passing through the points at Montpelier box, and applied it again 30 or 40 yards from the north end of the platform, still not considering the speed was too high. Forty or 50 yards from the buffer stops I thought the speed was too fast, and my mate then reversed and put on steam. We struck the buffers at less than a walking pace. We neither of us jumped off, and we were not knocked down or hurt. I cannot account for the break not taking more effect; the blocks were in good order.

Conclusion.

This serious collision of a passenger train with buffer stops at Brighton station was caused by the experienced driver of the train (a man of 19 years service in that capacity, and of previously good character) having entered the station at too high a speed, and not having taken in time the necessary means to reduce it. The compressed air break was applied to the engine (though not to the train), and it was

perfectly within his discretion to have had it in action or not, as he thought fit. He informed me that neither on the journey to or from Hayward's Heath had he put it in action on the morning of the collision, as the train was light, and he considered the hand-break sufficient. It is, however, to be regretted that he had not made use of it, for had he done so the control of the speed of the engine would have been entirely in his own hands; whereas it is highly probable that the action of the fireman in releasing the hand-break at Montpelier cabin, 610 yards from the buffer stops, allowed the train to continue at the speed, which the driver, depending upon the fireman, too late observed to be higher than he could control. The guard of the train appears to have acted properly.

The evidence of the driver and guard of the train affords a curious illustration of the ideas of speed entertained (or professed to be entertained) by so many railway servants. The distance from Preston to Brighton being $1\frac{1}{4}$ miles, and the time allowed for running it (not certainly exceeded, but rather the contrary on the present occasion) being three minutes, there must have been—allowing for starting and stopping—a maximum of 35 miles an hour attained during a considerable part of the distance; yet the driver says that the maximum speed attained was 18 to 20 miles an hour, and the guard 11 miles an hour!

I have, &c.,

C. S. HUTCHINSON,

Major-General R.E.

The Secretary,
(Railway Department,) Board of Trade.

Printed copies of the above report were sent to the Company on the 7th July.

NORTH BRITISH RAILWAY.

Board of Trade, (Railway Department,)

13, Downing Street, London, S.W., 25th April 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 17th inst., the result of my inquiry into the circumstances attending a collision which occurred on the 8th inst., between Cardenden station and Thornton junction, on the North British Railway Company's line from Stirling to Thornton junction.

In this case the 1.55 p.m. up passenger train from Dunfermline, consisting of engine and tender, loaded cattle truck, one third, one second, and one first class carriage, and break-van in rear, while running during a fog, overtook and came into collision with the tail of a ballast train, consisting of engine and tender, 18 loaded ballast trucks, and break van, which was proceeding in the same direction on the up line.

One passenger complained of injury, and the guard of the passenger train was also cut on the head.

The break-van and one truck in the ballast train were slightly damaged, but none of the vehicles in the passenger train sustained any damage.

A large number of chairs were broken.

Description.

The scene of this collision was a few yards over $3\frac{1}{2}$ miles west of Thornton junction, and about $1\frac{3}{4}$ miles east of Cardenden, on an embankment about 25 feet in height. The line running from west to east falls from Cardenden on a gradient of 1 in 200, is straight for about half a mile, up to a point 600 yards west of the point of collision, and is then on a 28 chain curve to the left, up to and beyond this point.

The view from an approaching train is impeded by a cutting, and is limited to about 300 yards.

Lochgelly colliery sidings are 1 mile 55 chains west of Cardenden station, Lochgelly station being about half a mile, and Lumphinnans junction about $1\frac{1}{2}$ miles further west.

The line is not worked on the block system. Under the rules in force goods trains must not be started within 10 minutes of an ordinary, or 15 minutes of an express or fast passenger train being due on the same line, and an interval of five minutes must be maintained between the starting of one train after another in the same direction.

Evidence.

1. *Samuel Morrison*, signalman 20 years, states :— On the 8th inst. I came on duty at 6.30 a.m. at Lochgelly Colliery, or No. 12 siding. My tour of duty is over at 8 p.m., when my box is shut up for the night. A little before 12 o'clock the ballast train from Ladybank came into the sidings to load ballast. It remained there till 2.10 p.m., when James Turner, the ballast foreman, who was in charge of the train, asked me if I was going to let him out. I told him he was rather late. He said, "If you let us out it will put us greatly forward." I answered, "You have little time; you are upon the passenger time." He replied that he had run miles in front of the passenger train before, and that she had "never made an inch on him." Then I let him out. It was then just 10 minutes past 2 o'clock. The passenger train, 1.55 p.m. from Dunfermline, is due to pass my box at 2.19 p.m. It passed on the 8th inst. five minutes late, that is, at 2.24 p.m. I know the rule that goods trains are not to be allowed to leave within 10 minutes of a slow passenger train. The 1.55 p.m. train from Dunfermline is a slow train. There was a goods train, 12.10 from Dunfermline, which passed shortly before the time at which I let out the ballast train, but I can't say exactly how long. I didn't book it on that day. I ought to book all passing trains.

2. *Robert Hutchinson*, passenger porter six months, states :—I am in charge of the signals at Cardenden station, under the station-master. On the 8th inst. the 12.10 up goods train from Dunfermline, due here at 1.1, arrived at 2.16 p.m. It put in a waggon into the station siding, and left at 2.20 p.m. That is five minutes before the 1.55 up passenger is due. Then it went on to the Colliery sidings to lift waggons, and finally left at about 2.25. I told the goods guard to shunt, and he pointed out that the crossing was blocked, so that he couldn't shunt. At 2.25 p.m. the ballast train arrived. The distant-signal was at "danger" against it. There is no home-signal. The distant is about 800 yards off. He came past the distant-signal, and stopped behind the goods train, which was just moving off. This was at about 100 yards east of the station. I waved to him to set back across the road, so as to put him into Cardenden Colliery siding, which was empty at the time. No attention was paid to my signal, but the train went on after the goods train. I am certain the driver, fireman, and ballast foreman, who was on the engine, saw the signal. At 2.28 the passenger train arrived, three minutes late. I left at 2.29, four minutes behind the ballast train. I cautioned the driver that the two trains were only two or three minutes started. The stationmaster was on the platform. I know that there is a rule that an interval of five minutes is to be maintained between all trains. This rule is very seldom adhered to, in my experience of six months. Trains are generally allowed to go on with a caution. It was a very foggy afternoon. I should say that signals were visible for about 70 to 100 yards. The lamps were lighted, but there were no fogmen out. The ballast train had tail lamps on, but they were not lighted. I signalled to the driver of the ballast train as he passed the platform. I am certain I warned the driver of the passenger train.

3. *James Dall*, stationmaster at Cardenden :—I was in the office when the ballast train passed, so that I cannot say what passed between the porter and the driver. I was on the platform when the passenger train arrived. I didn't hear the porter warn the driver that the ballast train was close ahead of him, but the ballast train was still in sight when the passenger train was coming in. I saw it myself. I gave permission for the passenger train to start. I didn't warn the driver myself, but I asked the porter, and he said he had done so. The passenger train would not be in more than two minutes. I know rule 170. I have been 28 years stationmaster. I have never

been in the habit of keeping back a passenger train when there is another train less than five minutes ahead of it. I always send them on with a caution.

4. *Robert Lawson*, engine-driver nine years, states :—On the 8th inst. I was driving the engine of a ballast train from Ladybank. We went into Lochgelly Colliery sidings to load at about 10 o'clock. We finished our loading at about 1.45 by my watch, which was right. I drew my train out up to the pointsman's box, and whistled for the signal. I then came out on the main line, and the van, which was on another siding, was let down and hooked on. My train then consisted of tender, engine, running tender first, 18 loaded trucks, and break-van. My engine was about 70 yards east of the pointsman's box. I whistled and started. It was just 2 o'clock by my watch, or it might have been as much as a minute or two past. I am sure it wasn't 10 minutes past. Nothing passed between me and the pointsman. The ballast foreman was on my engine. The pointsman spoke to him as we passed his box. He said, "Are you going out?" or words to that effect. The foreman said, "Yes;" nothing more at all. Nothing about the passenger train. Nothing about running ahead of it. I can't say how long the goods train had passed. I came a fair speed, perhaps 15 miles an hour up to Cardenden distant-signal, which I saw about 200 yards off. It was at "danger," so I shut off steam and came slowly into the station, perhaps four or five miles an hour. I didn't look at my watch, but the fireman said it was about 2.10 or 2.12 as we passed the sidings points west of the station. I could see the goods train in front of me, and I pulled up about 30 yards short of the tail of it. I stopped there about five minutes, I should think. The goods train was moving off when I stopped. It went on to Cardenden Colliery sidings, lifted some waggons, and then went right away. I followed at once, keeping the van in sight as far as Clunie coal sidings, when it went ahead out of my sight. I came in sight of it again a little further on, and very soon after I was overtaken by the passenger train. At the time I was overtaken my engine was just over the viaduct over the river. I was running over fifteen miles an hour at the time. My train was driven up on to the engine. I could feel the shock, but was not knocked down. I shut off steam when I felt the shock, but didn't put on my breaks, or try to stop the train. One of the ballast men—the flagman—jumped out of the van, and ran back, and I then put on my break. This was a minute or two after we were struck. We ran more than half a mile before we stopped. When we stopped I got out and went back. I found the rear truck with the leading wheels off the rails, and buffer locked with the one in front. The van was slightly damaged. I went back and found the passenger train standing about a train's length behind me. I left Lochgelly Colliery sidings 18 minutes before the passenger train was due by my calculation. When I passed Cardenden station the porter was on the platform. He pointed ahead, and I thought he was pointing at the van of the goods train, which was standing on the main line. When I left Cardenden I knew that the passenger train was almost due. I didn't shunt, because I didn't think Cardenden Colliery sidings would hold my train. I didn't think the porter was signalling to me to shunt. The collision occurred at about 2.30 p.m. At that time one could see 200 yards ahead. I stopped at the station platform at Cardenden, and stood there for four minutes behind the van of the goods train. I didn't know whether the van was attached or detached at that time. When it went on I followed it down, and then it was detached while the engine lifted some waggons out of the Colliery siding.

5. *William Grey*, fireman $1\frac{1}{2}$ years, states :—On the 8th inst. I was fireman to Richard Lawson. We

left Lochgelly Colliery sidings at 2 p.m. exactly. Nothing passed between the pointsman and anybody else, that I heard, except that he asked the foreman if he was going out, and he said "Yes." It was 2.12 when we got to Cardenden sidings.

6. *Robert Hutchinson* recalled, states :—I am sure that the ballast train did not stop opposite to the platform, and when it did stop the van of the goods train was 100 yards east of the station.

7. *James Dall* recalled, states :—The ballast train did not stop opposite to the station.

8. *David Speed*, goods guard three years, states :—On the 8th inst. I was guard of the 12.10 up goods train from Dunfermline. We left at 12.50. We passed Lumphinnans at 1.57. We left Lochgelly at 2.5, and passed Lochgelly Colliery siding at about 2.7. We arrived at Cardenden at 2.11 or 2.10. We stopped with my van about 20 or 30 yards west of the station. The engine and part of the train was then detached and put with a waggon into the sidings; came out and hooked on again. We then pulled on to the colliery sidings, and the engine and two waggons were then detached, and picked 11 coal waggons out of the sidings; came out, hooked on, and went right away. I was on the platform, and started my train after putting the first waggon in. The ballast train hadn't then arrived, at least I didn't see it. I saw it coming slowly down past the station, just as we were starting from the colliery after the train had been made up again, and that was the first time I saw it. There was no way for me to shunt at Cardenden out of the way of the passenger train. My train was never stopped opposite to the platform.

9. *James Turner*, ballast foreman, states :—I was in charge of the ballast train on the 8th inst. We got into the siding at Lochgelly Colliery at about 11 p.m. At 2 p.m. by the driver's watch we drew out on to the up main line, and my van, which was on the colliery line, was let down on to it. The only thing which passed between me and the pointsman was that he asked me if we were going away, and I said "Yes." He never mentioned the passenger train, nor did I say anything about running ahead of it. I saw the goods train pass, I should think about five minutes before we left. I didn't look at my watch, because it was not keeping very good time; I trusted to the driver's watch. We came right away, at about 15 miles an hour, to within sight of Cardenden distant signal, which was visible about 100 yards off. It was at "danger," and we came slowly past it. We pulled to a dead stand at the platform. The van of the goods train was standing opposite to the platform when we stopped, close up to it. It was just moving away, and we followed it up to the colliery sidings, where we stood three or four minutes behind it. When it started away we followed it right away, keeping it in sight. This was at 2.23 by the driver's watch. When we stopped at the platform I didn't see the porter. I never saw him at all. I was on the right-hand side of the engine. I didn't shunt out of the way of the passenger train, because we were not told to do so, and there was no room for us. We had 18 waggons and a van on. I got no signal from any one to start from Cardenden. My break-van was slightly damaged, and one truck. The one next to the van was knocked off the rails, but was not damaged. It ran off the rails for three-quarters of a mile after the accident. The passenger train stopped a few yards back behind the place where the van was standing, after we had stopped. I know that there is a rule that ballasting is not to be carried on in foggy weather. We were not ballasting, but were taking a ballast train from one point to another.

10. *David Lyon*, passenger driver 25 years, states :—On the 8th inst. I was driver of the 1.55 p.m. up passenger train from Dunfermline, consisting of engine

and tender (running engine first), cattle waggon (loaded), five passenger carriages, and break-van in rear. We left Dunfermline right time, and left Lochgelly at 2.22, four minutes late. We had a fair run to Cardenden, where we arrived at 2.28. We left about one minute afterwards. When we arrived I asked the booking clerk, who was on the platform, if there was anything before us. He said "Two trains," I think; and a surfaceman who was working at the side of the line said that a goods train and the ballast train were ahead of us. I understood this to mean that they were a short time ahead of us, within the regulated five minutes. The porter did not speak to me at all, nor did the station master. The porter pointed ahead, and that is the reason that I spoke to the booking clerk. We started from Cardenden at 2.29. It was very thick, so thick that we couldn't see 50 yards ahead. It got thicker as we proceeded. I passed the signals at Clunie coal and Clunie lime sidings so slowly that I could have pulled up at the signals if necessary; not more than 12 miles an hour. I put on speed a little, and was going at about 15 miles an hour when I saw the red van of the ballast train through the mist, about 20 yards off. It was moving ahead at the time. I shut off steam at once, reversed my engine, and sounded my whistle for the breaks; and my mate put on the tender breaks, and opened the sand-boxes. We had reduced to about half speed when we struck the break-van. There was hardly any shock. The ballast train went on ahead, and then I followed slowly so as to get my train quietly under protection. I called out to some surface men to go back to protect the train, and the flagman of the ballast train also went back. I never pulled up altogether till we had gone about three-quarters of a mile. I stopped about 20 or 30 yards behind the van of the ballast train. I only touched it once. My engine was not damaged. It is a single engine, with 6-ft. driving wheels, and with 6-wheeled tender, having a break block on each tender wheel. I didn't note the time when the collision occurred.

11. *Thomas Kirk*, fireman 18 months, states :—The fog on the 8th was so thick at the time of the collision that it was impossible to see more than 20 or 25 yards ahead. We were running about 15 miles an hour when we saw the train in front. I can't say how fast we were running when we struck it.

12. *Peter Kiel*, passenger guard 14 years, states :—On the 8th inst. I was guard of the 1.55 p.m. passenger train from Dunfermline, consisting of engine and tender, cattle truck, third-class, second-class, and first-class carriages, and break-van in which I was riding. We left Cardenden at 2.30. It was very foggy. I could scarcely see the engine from my van. We went pretty slowly past Clunie sidings, and then increased speed to about 15 miles an hour. The first thing I knew of anything being wrong was from having my head knocked through the window. We were then running about 15 miles an hour. I hadn't put on my break, because I didn't think I heard any whistle. After the first shock the train went slowly on for about three-quarters of a mile, and I then got out. There was no damage to the train, and no passengers complained of injury at the time. I can't say at what time the collision occurred. There was no one in the engine but the driver and foreman, and both were quite sober. At Cardenden I asked what was ahead. The porter told me there was a train ahead. I asked him how much, and he said "You'll never see them," and we got a signal to start. I didn't say anything to the driver about it, but I heard the surface man telling him.

13. *Robert Christie*, acting guard of ballast train, states :—I was knocked down by the collision, and then got out and went back to protect the train. We had stopped at the west end of the platform at Cardenden. We left Lochgelly Colliery sidings at 2.2 p.m. We were running from 15 to 20 miles an hour when

the collision occurred. When my van was passing the platform I saw the porter lower the down distant signal. I suppose this was for the down fast train, due to pass there at 2.36 p.m., so that it could not have been intended to shunt us across the down line into the Cardenden Colliery siding.

14. *Andrew Watson*, surface man, states:—I was working opposite to the platform when the ballast train passed. It was moving slowly ahead. I didn't see the porter. I told the driver of the passenger

train that the ballast train was before him. I didn't say how long. I didn't hear the porter say anything.

15. *Charles Hain*, surface man, states:—I told the driver of the passenger train that the ballast train was ahead. This ballast train was then about 300 or 400 yards off at the time, near the bridge. I could see it at the time. The driver asked me what was that before him, and I said the ballast train. I thought by his asking me that he could see it himself.

Conclusion.

The evidence in this case is most conflicting and unsatisfactory, and it is difficult to arrive at the true facts concerning the collision.

The statements of the whole of the men with the ballast train agree exactly, but, with regard to the time at which the train left Lochgelly Colliery sidings, a very vital point, they are contradicted by the signalman at these sidings, whose statement I am the more inclined to believe, because it condemns his own conduct, and was given in a straightforward manner; and by the statement of the guard of the preceding goods train as to the time at which this train passed the sidings. With regard to the position at which the ballast train stopped at Cardenden, and to what passed there, they are contradicted by the evidence of the station-master, the porter, and the guard of the goods train; and with regard to the speed at which they were running at the time of the accident, they are contradicted by the evidence of the driver, fireman, and guard of the passenger train which overtook them, and by the fact, which has since been reported to me, that the ballast-men in the rear van were able to jump out without injury before the collision actually occurred, which they certainly could not all have done if the train had been running at from 15 to 20 miles an hour; and I am, therefore, unable to attach much credit to what is plainly a well concocted story on the part of the driver and fireman of this train and the ballast foreman.

It would therefore appear that the ballast train was allowed to leave Lochgelly Colliery sidings at 2.10 p.m., only nine minutes before the time at which the passenger train was due; that it did not stop until beyond Cardenden station; that it almost at once proceeded, without getting any signal to do so, immediately behind the goods train, and only at the outside two minutes ahead of the passenger train, instead of stopping to shunt in accordance with the rules; and that it was running certainly considerably under 15 miles an hour when overtaken by the passenger train, running somewhat over that speed.

It further appears that a very large proportion of the servants of the Company concerned are to blame for this collision, which discloses a very lax mode of working on their part.

In the first place, under Rules Nos. 232 and 344, the ballast train ought not to have been on the line at all in such foggy weather, and for this the driver and ballast foreman in charge are responsible. These men are also to blame in not stopping to shunt at Cardenden, where it seems that there was room for even a longer train, and for proceeding without any signal immediately behind the goods train, even allowing that they did not understand that the porter had signalled to them to shunt. The signalman at Lochgelly is, perhaps, the most of all to blame, in having allowed the ballast train to leave the sidings only nine minutes before the passenger train was due; the porter at Cardenden is to blame for not having taken more energetic steps to cause the ballast train to stop and shunt, and for not having properly cautioned the driver of the passenger train that the ballast train was close ahead of him; the station-master is to blame for having permitted the passenger train to start within five minutes of the departure of the ballast train, although it would appear from his statement that Rule 170, which prescribes this limit of time, is not always observed, if not habitually disregarded; the driver of the passenger train is to blame in not having attended to Rule No. 96, in accordance with which he ought, before starting, to have ascertained "the exact time at which the preceding train left," and he certainly erred in running without due caution in such a thick fog, knowing, as he admits he did, that this train was under five minutes before him; and, lastly, the acting guard of the ballast train is to blame for not having had the tail lamps of his train lighted before starting in a thick fog.

The best safeguard against the recurrence of accidents of this nature would be the extension to this line of block telegraph working, and it is to be hoped that the Company will cause this to be done; but, in the meantime, it would be well if the

station-masters, engine-drivers, signalmen, and others on the line were warned that they are to adhere strictly to the Rules issued for their guidance, and if steps could be taken to ensure that all cases in which they fail to do so should be brought to the notice of the proper officials and the offenders punished; for nothing can tend more to diminish the value of such Rules and Regulations than permitting them to be disregarded with impunity.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
F. A. MARINDIN,
Major R.E.

Printed copies of the above report were sent to the Company on the 15th May.

NORTH BRITISH RAILWAY.

SIR, Board of Trade, (Railway Department,) 13, Downing Street, London, S.W., June 30th, 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 19th ultimo, the result of my inquiry into the causes of a collision which occurred on the 17th ultimo at Whitemyre junction, near Dunfermline, on the North British Railway.

In this case the 4.15 p.m. fast up passenger train from Glasgow to Aberdeen (via Tay Bridge), consisting of engine and tender, one third-class, one first-class, three composites, one third-class and one composite, and rear break-van, while running at about 35 miles an hour, came into collision, at about 5.55 p.m., with an engine and tender which had been uncoupled from its train on the West of Fife mineral line, and brought out through the safety-points foul of the up main line. The whole of the passenger train, with the exception of the rear carriage and break-van, left the rails; and the driver of the passenger engine, which was turned round and upset, was killed on the spot, being crushed under the cab of his engine, and his fireman and another driver and fireman who were on this engine were badly injured, the second driver having lost one leg and a thumb.

There does not appear to have been any serious injuries to passengers, as the two front carriages, which were upset, were fortunately empty, or nearly so. Two passengers, who at the time complained to the conductor of being hurt, have not since made any application to the Company.

About 55 yards of the permanent-way were cut up, and the following materials have been used to replace what was damaged, viz.: One set of switches, nine rails with fish-plates and bolts, 111 sleepers, and 95 chairs with keys and spikes.

The passenger engine and tender were very much damaged, the goods engine slightly damaged, and its tender almost destroyed. The leading carriage, which was upset, lost its wheels, and, with the next carriage, which was also upset, was much damaged. The other six vehicles in the train, which remained in an upright position, were all more or less damaged.

The total damage to the rolling stock is estimated at 328*l.* 10*s.* 0*d.*

Description.

At Whitemyre junction, about $1\frac{3}{4}$ miles west of Dunfermline station, the Stirling, Alloa, Dunfermline, and Thornton section of the North British Railway, running from west to east, is joined by the West of Fife mineral line, a single line, which approaches from the north, and, after running for a little over 300 yards parallel with the main line, forms a single junction with the up line of rails.

There is a goods yard with extensive sidings in the angle formed by the two lines, and further east, at the point of junction, are other sidings at both sides of the line, where the points of a siding called Morton's siding, on the north of the main line, act as safety-points for the junction, being weighted to lie in their normal position right for this siding.

The collision took place at the fouling point of this junction, the goods engine standing actually on the up main line, with its tender obliquely across the left or outside rail of this line.

The signal-cabin, or pointsman's box, is 192 yards west of the junction, and almost opposite to the connexions of the goods yard with the mineral line.

There is an up distant-signal, not visible from the cabin, 1,213 yards from the point of collision, and a repeater for this signal on an overbridge 692 yards from this point, and within view of the cabin.

There is no up home-signal, there is no interlocking, and the points are worked by hand from the ground.

The main line falls from the up distant-signal towards Dunfermline on a gradient of 1 in 120 as far as Whitemyre junction signal-cabin, and then on a gradient of 1 in 140 past the point of collision.

The main line is nearly straight, and an approaching train on the up line can be seen from the point of collision as soon as it comes under the overbridge, upon which the repeater of the up distant-signal is placed, that is, for a distance of nearly 700 yards. The branch falls towards the main line on gradients of 1 in 53 and 1 in 89.

The passenger train was fitted throughout with Westinghouse's break, but the regular engine being in the shops for slight repairs to its tyres, this break was not connected with the engine attached to the train, which engine was only partially fitted with the apparatus for working the break.

Evidence.

1. *John McIntyre*, goods guard 12 years, states: On the 17th instant I was acting as goods guard to a coal train working on the West of Fife section. At 5.30 p.m. we arrived at Whitemyre junction on the branch, with a train consisting of engine and tender, five waggons of coal, and break-van. When we arrived I went in with the way bills to the agent, and on coming out of his office the fireman was backing into the sidings called Morley's sidings, with the coal waggons, two of which were to remain there during the night. Then I told him to come out and put three others into the shed road siding. The driver, Henry Buchanan, was off his engine, walking down the line. As soon as I had told the fireman to put the waggons into Morley's sidings I followed the driver. We went to a public-house in the street and remained there about three minutes. We had just come out into the street again and were standing talking, when I heard the collision take place. We were not more than 50 or 60 yards off. I cannot say exactly the time. We had to lift two waggons at Whitemyre, one to be left in Morton's sidings, and the other to go up to Dunfermline with the engine and van. Neither of these were lifted when I left the train. As soon as we had finished work at Whitemyre we had to go home to Dunfermline, but not till the express had passed. I knew the express was due. I did not give any instructions whatever to the fireman about lifting the waggons or putting one into Morton's sidings. I expected to be back by the time he had put the waggons into the shed road. I was in charge of the shunting operations under the station agent. The signalman had shifted the sidings points. The station agent was in the office. As soon as I heard the collision I ran back and found that the express had come into collision with the tender of our engine at the fouling point of the junction with the main line. The goods engine was on the rails of the up line about 30 yards beyond the points, the tender was smashed, but I am not sure where it was lying, or whether it was attached to the engine. The express engine was lying upset, with its head towards Glasgow, on the down line about 30 yards from the points; the tender was lying upset between the main line and Morton's sidings; the two leading carriages were upset on Morton's sidings; the next three were off the rails and partly upset, and the remainder off the rails, except the last carriage and the van, which were still on the rails. I found the driver of the express engine lying dead under the engine. I did not hear the driver of my engine give any orders to his fireman. I know I had no business to leave my train. None of us had been drinking before. The fireman had tasted no drink all day that I know of. I heard the express give two short whistles just before the collision took place. I asked the fireman what tempted him to foul the main line, and he said he did not know. He said no more, and

I have not seen him since. He was not hurt, having jumped off.

2. *Andrew Whitehead*, station agent at Whitemyre junction, 13 years in the service, and eight years at Whitemyre, states: On the 17th instant the special Bower's Hall coal train arrived at about 5.30 p.m., and had five waggons of coal to put off at Whitemyre junction. I was in the office at the time, and the guard came in to me with the way bills. I gave him no orders. He was telling me about a waggon he had brought down previously wrongly addressed. He asked me to alter the address. Then he went out to do his shunting. I did not take any part in the shunting. It is not my custom to do so when the guards understand what they have to do. I remained in my office until the five waggons had been put off and two others lifted. Someone called to me that they had finished shunting, and I came out. I found the van uncoupled on the West of Fife main line, and the engine, with two waggons attached, moving towards the junction. I got on to the van in which I was going to Dunfermline after the express had passed, and just as I was jumping on I saw the signalman going towards his signal-box, just crossing the West Lie sidings. I called to ask if the express had passed. He said "No." I got on to the van. There was a young lad in the van, one of my clerks. He took the break off and let the van run down towards the junction, and it was coupled on to the two waggons by David Black, another clerk. I was looking back towards the bridge, expecting to see the express coming. I saw it coming, or at least the steam of it over the bridge, immediately after the van had been coupled. Then I saw it coming through the bridge, and then saw the second signalman come from his box across the line, holding up his arms towards me and shouting. I then looked round and saw that the Bower's Hall engine had been uncoupled and run forward through the safety-points foul of the main line. I also called out to the fireman on the engine, but he seemed to be confused. I think he reversed his engine and put on steam, but then shut it off again. His engine was nearly stationary. I heard the break-whistle sounded from the express engine when it was some distance beyond the signal-cabin. I should think between 50 and 100 yards, or nearly opposite to the end of our West Lie sidings. I cannot form any estimate of the speed. It was 11 minutes late. I cannot say that the express was coming any faster than usual. I did not observe whether steam was on or off. The engine came past me at a considerable speed. I saw it strike the tender of the coal engine at about the centre of the right side. I did not see what the men on the engine did. I jumped down and went to give assistance. The driver and guard of the coal train were both away from the train, but I did not know it till after the

van had been let down and coupled on. I asked where the driver was, and was told he was down the street. I had no idea that the fireman was doing the shunting in the absence of his driver. I have seen this happen before when the drivers are at their dinner. I know this is contrary to rules, but I have not reported it when I have observed it. After the accident I went to give assistance, and I found that the driver of the express, Richard Henderson, was killed under his engine. His fireman, William Smith, was hurt. There were two other men on the engine. Thomas Ramage, a driver, was very badly hurt, his leg having been since amputated, and his fireman, Alexander Betts, was slightly hurt. None of the passengers made any complaint to me of being hurt. I inquired from the fireman of the coal train, James Robertson, and from the clerk, David Black, who had been on that coal engine, how the accident had occurred. David Black told me that one of the waggons had to be put into Morton's sidings, and that he had pulled over the points so that the engine could go out on to the main line, and the waggon be dropped into the sidings. He did not say who uncoupled the engine. He had no business to meddle with the points at all. The fireman told me much the same story, but neither of the men said who had told them to do so.

3. *William Taylor*, second signal porter 16 months, five years in the Company's service, states: I have been doing the duty of second signal porter at Whitemyre junction for 16 months. On the 17th instant I came on duty at 6 a.m. My tour of duty is till the last train passes at 7.20 p.m. when the box is shut up. At 5.35 p.m., the coal train arrived on the branch, and I went to assist in the shunting by holding the points. I also did some of the uncoupling, as the guard went away. Before leaving my cabin the signals were lowered for the express, which was due to pass at 5.44. The coal train dropped two waggons into Morley's sidings, came out, dropped three into the shed road, came out, and picked up one waggon out of West Lie, and then put out another from Steel Yard sidings for Dunfermline. The engine took these two waggons down towards the junction, the front waggon being for Morton's sidings. I said to the fireman who was in charge of the engine, the driver being away, "There is one waggon for Loch Head and one for Dunfermline." He knew that the Loch Head waggon must go into Morton's sidings for the night. I did not tell him anything about putting it there. I cannot be sure whether Black was on the engine or not. I came down on the engine and jumped off opposite my cabin. I stood there and saw the van being let down to the engine. The express was not in sight when the van passed me. About two minutes later the steam became visible over the bridge. I then saw the express come through the bridge, and put back the signals to "danger." Immediately I had done this I crossed on to the branch line, and, on looking round, saw Black holding the points of Morton's sidings, and the coal engine moving forward through them, and fouling the main line. I held up my arms and shouted at the top of my voice. At this time the express was behind me as I was standing, but I cannot say how far. When I shouted, the coal engine had just commenced to move. Very soon after I heard the break-whistle from the express engine. The driver must have whistled the moment he could have seen the goods engine foul the line. I cannot

say how far the express engine was behind me when the whistle was sounded. I think the steam was off before the express came through the bridge. It was 10 or 11 minutes late, but I do not think it was running any faster than usual. I cannot estimate the speed. I cannot say whether or not the breaks were applied. I saw the fireman on the goods engine jump off. I did not think anything of the fireman doing the shunting, for it is often done when the driver is at his meals. I have seen the same fireman do it in the same driver's absence. The accident happened at 5.55 p.m.

4. *Henry Buchanan*, goods driver 3½ years, states: On the 17th inst. I was driver of the special Bower's Hall coal train. On arrival at Whitemyre junction at 5.30 p.m. with five loaded coal waggons, I stopped to get them checked by the clerk, and then went down to the points to set back into Morley's sidings. I dropped two waggons there, and then came down to the points again, and then got off my engine. The fireman put the engine with the other three waggons into the shed road, and I went away. I told the fireman that we wouldn't get away before the fast, and I intended him to remain in the shed road sidings. I didn't know anything about the other two waggons to be lifted. I never inquired if anything more was to be done before I went away. I was in the street with the guard when the accident occurred. After the accident I saw that the express engine had been reversed. I allowed my fireman to put back the waggons into the shed road. I know that there is a strict order against engines being moved at all by firemen in the absence of their drivers. I have before allowed my fireman to do so. I wasn't above eight or 10 minutes away.

5. *James Gray*, passenger guard five years, and 14 years in the service, states: On the 17th inst. I was guard of the 4.15 up fast passenger train from Glasgow to Aberdeen. We left Glasgow, three minutes late, with train consisting of engine and tender, one third, one first, three composites, one third, one composite, and break-van in rear. I was riding in the rear van. We left Alloa at 5.34, 11 minutes late, and had no stoppage between Alloa and Whitemyre. I didn't observe the Whitemyre signals. We came under the overbridge at from 20 to 25 miles an hour, about the usual speed, with steam off. I was looking out of the left-hand side window of my van, and saw the goods engine coming out of the siding. I think my van was about opposite the signal-box at the time. I got three or four turns of my break when the collision occurred. I never heard any whistle from the engine. I was knocked over, but not hurt. A conductor was with me in the van. When I got out I went forward to the engine, and then back to protect my train. I didn't make any inquiries among the passengers, and none made any complaints to me. The train was fitted throughout with Westinghouse break, but was not connected. The two front carriages were nearly empty.

6. *Alexander McIntosh*, conductor two months, and eight years in the Company's service, states: On the 17th inst. I was in the guard's van of the 4.15 fast train when the accident occurred. I can corroborate his evidence. The Whitemyre signals were right for us. Two passengers complained to me of being hurt, but they were not seriously injured, and they could walk to the train which came for them.

All the men on the passenger engine were too much hurt to appear at my first inquiry on the 21st May, and the evidence of two of them, given on a subsequent occasion, is detailed below.

7. *William Smith*, foreman three years, states: On the 17th May I was fireman to Richard Henderson, who was driver of the 4.15 p.m. fast passenger train from Glasgow to Aberdeen. Henderson's own en-

gine, No. 224, was taken into the shops for slight repairs to wheels, two or three days before the 17th, and on that day he was driving engine No. 427, which was not completely fitted with Westinghouse's break

as his own engine No. 224 was. We left Glasgow about two minutes late, and lost a little time on the way at stations, it being Saturday. At Stirling, driver Ramage and his fireman Betts, who had brought a light engine to Stirling, shifted their tools on to our engine, and, the signal to start being given just as they had completed doing so, they stepped on to our engine and remained there. We left Alloa at about 5.29 and found the signals right for us all the way. On approaching Whitemyre junction we were running from 35 to 40 miles an hour with steam on. The first intimation I had of anything being wrong was from hearing the driver give three or four short sharp whistles. We were then, as far as I can recollect, past the pointsman's box. I was on the right-hand side of the engine, and, on looking over, I saw the coal engine coming out of the sidings foul of the main line. My driver reversed his engine and got steam against her, and I opened the sand-boxes and got to my break. I don't think I had time to do more than take up the slack of the break before the collision occurred.

I had seen the coal engine steaming forward on the branch about 200 yards back, but I had no idea that it was doing anything more than some shunting on the branch, or that it was coming out on to the main line. I am certain my driver saw the obstruction as soon as it was possible for him to do so, for when I looked out after he had whistled, the coal engine was just half foul of the main line. The man on the engine shut off his steam when he heard our whistles. We were full in sight of the men on the engine if they had chosen to look round. Our break was an ordinary screw tender break with one cast-iron block on each of the six wheels. It was in good order. I don't think we had more than five to seven seconds to

do anything in. I was thrown off by the collision and badly cut about the back. I cannot remember much that happened afterwards. I was off work over three weeks. I didn't see the pointsman myself, nor did I remark the signals after we had passed them.

8. *Alexander Betts*, fireman 2½ years, states: On the 17th May I was fireman to Thomas Ramage. We took an engine to Cowlairston from Dunfermline and left it there. We then brought another engine to Stirling and left it there. We shifted our tools on to the engine of the 4.15 down express at Stirling, and got on to the engine ourselves. We had not got a pass at Cowlairston, and so we did not get into a carriage at Stirling or Alloa, but remained on the engine. I was sitting on the right-hand side close to the fireman. On approaching Whitemyre junction we were running from 35 to 40 miles an hour as near as I can judge. I did not know anything was wrong until the driver cried out to stop, and sounded his whistle. At that time I am certain we were past the pointsman's box. I did not see the pointsman at all as we passed. The driver reversed and got back steam, and the fireman opened the sand box and ran to his break, but he had not time to do much before we struck the tender of the coal engine on its right-hand side. We all stuck to our engine, which I am told was thrown over on its side, but I cannot remember myself what happened. I was badly hurt in the legs and hand, and have been off work for a month. My driver had lost one leg and a thumb, and was badly cut on the head. I am sure that the distant-signal was not put back to "danger" until long after we had passed the overbridge, for I looked back to see after we had passed McLeod's Foundry.

Conclusion.

The evidence in this case, although slightly conflicting on one or two minor points, leaves no doubt as to the causes of this unfortunately fatal accident.

It is clearly proved that the driver and guard of the Bowers Hall coal train, which had arrived at Whitemyre upon the branch line at 5.30 p.m., left their train before the necessary shunting operations had been properly completed, and that in so doing they acted in contravention of the rules of the Company.

The fireman of this train being left in charge of the engine, proceeded to carry on the shunting, and, although very possibly he acted on this occasion without any orders, yet there can be no doubt, from the evidence of all concerned, that in so doing he was only following a very common practice, which is nevertheless entirely opposed to one of the rules of the Company, by which firemen are prohibited from moving an engine in the absence of their drivers.

Having put all the coal trucks composing the train into the sidings in the goods yard, he then picked up two waggons, one of which had to be left in Morton's sidings, while the other was to go to Dunfermline with the engine and van as soon as the fast passenger train had passed.

These two waggons were brought down the branch as far as the points of Morton's sidings, the engine came to a stand, and the goods break-van, which had, during the shunting operations, been left about 400 yards back up the branch, was let down by a goods clerk, together with the station agent, and coupled to the rear waggon of the two attached to the engine. Almost immediately after this was done, the goods engine was uncoupled, and another goods clerk, David Black, who was with the engine, having opened the points, the engine was taken out through them foul of the up main line, with the object apparently of allowing the leading waggon to be let down into Morton's sidings, and so hurrying forward the work, and preparing to get away to Dunfermline as soon as possible after the passenger train. Both the men concerned in this operation being in custody, their evidence has not been taken, but both are responsible for what occurred, as the clerk had no business to meddle with the points at all, and the fireman, who was at this time in charge of the engine, should have been guided by Rule No. 213, which forbids enginemen to "enter on the main line from a siding without the permission of the station agent or signalman."

The exact position of the passenger train at this moment is somewhat doubtful, for according to the evidence of the men on the engine of this train it was past the pointsman's

box, or within 168 yards of the point of collision, while according to the evidence of the pointsman and the station agent it was some 50 yards further off; but this point is not material, except so far as the consideration of the possible effect of a continuous break is concerned.

It is abundantly proved that when the points were being opened, the passenger train, some minutes overdue, and running probably about 35 miles an hour, was full in view of the men with the goods engine, that it must have been in view for some seconds, and that if either of them had before acting taken the ordinary precaution of turning his head to look along the up line, he must have seen the train approaching. It is also equally clear that it was impossible for the driver of the passenger engine to stop his train in time to avoid the collision, although he appears to have been keeping a good look out, to have seen the obstruction as soon as it was possible for him to do so, and, together with his fireman, to have bravely remained at his post to the last, doing all he possibly could to check the speed of his train.

The fireman of the goods engine seems to have been paralysed when he heard the whistle from the approaching train or the shouts of the pointsman and station agent, and he did the very worst thing he could possibly have done, by shutting off steam and remaining stationary. If it had fortunately occurred to him to run forward as fast as possible, the tender of his engine would probably have got on to the main line and have been struck fairly behind, whereas, standing where it did, it was struck obliquely on its right side by the left-hand leading end of the passenger engine, which was turned completely round, and upset on the right-hand side of the line, about 30 yards beyond the point of collision.

The tender of the goods engine was broken into pieces, but the engine itself received little damage, and was merely driven forward for some distance on the up main line.

The vehicles composing the passenger train ran only about 40 or 50 yards after the collision, the two leading carriages were upset on the left-hand side of the line, and all the others, except the rear carriage and break-van, were off the rails on the left-hand side; so that, considering the speed at which the train was running, and the violence of the shock, it is astonishing that the passengers should have escaped almost uninjured.

It is then beyond question that disobedience of orders, and recklessness almost inconceivable, on the part of the fireman of the goods train and the goods clerk, David Black, were the immediate causes of this collision, but the responsibility for it does not cease with the action of these two men. Both the guard and the driver of the goods train are directly implicated, for they also were guilty of disobedience of orders in leaving their train, and it is impossible to imagine that, if they had been in their proper places, they would, as experienced men, have been so senseless as to act in the same manner as did those who were doing their work, and probably the accident would not have occurred.

Further than this, it is only too clear from the evidence in this case, as it was from that in the case of an accident which recently happened near Cardenden on the same line, that there does not exist that discipline among the men, and that proper attention to the rules of the Company, which alone can ensure safe working on any railway, for not only does it appear that it is a common practice for engine-drivers to allow their firemen to move their engines, in spite of the stringent rule forbidding it, but it is admitted by the station agent, a man in authority and with 13 years experience, that he has allowed breaches of this rule to pass by unchecked and un-reported, and I consider that for this he is much to be blamed. It was also a breach of the rules of the Company for the second driver and fireman to be riding on the engine of the passenger train.

Having pointed out who are in my opinion in fault in this case, I must observe that all the carelessness and irregularity, to which I have called attention, could not have caused this accident, had it not been for the absence of proper appliances at this junction, for if there had been a proper set of signals, interlocked with the points and worked from a signal-cabin, or even if the safety-points had been interlocked with the existing signals, insufficient although they are, these points could not have been opened unless the signals had been against the passenger train, which would have had ample time to stop, and which, moreover, under a proper system of block telegraph working, would not even have been allowed to leave the preceding signal cabin, so long as these points were open for shunting purposes.

This section of the North British Railway has become of far greater importance since the opening of the Tay bridge, and it is to be hoped that this fact will induce the Company to lose no time in providing for it the means of working on the absolute block system, and also those proper signalling appliances which the travelling public

have now certainly a right to expect, and which ought to exist in the interests of the Company itself, and for the protection of its servants in the execution of their duty.

It was most unfortunate that the engine which is usually attached to this train was under repair, and that another engine not completely fitted with Westinghouse's break was temporarily in use, for it is probable that if the Westinghouse break, with which all the vehicles in the train were fitted, could have been utilized, the force of the collision would have been considerably mitigated, while, if the evidence of the station agent and the pointsman, as to the point at which the driver of the passenger train perceived his danger, be correct, it might even have been altogether averted.

I have, &c.,

The Secretary,
(Railway Department,) Board of Trade.

F. A. MARINDIN,
Major R.E.

Printed copies of the above report were sent to the Company on the 14th July.

NORTH BRITISH RAILWAY.

SIR,

Glasgow, 30th June 1879.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 27th instant, the result of my inquiry into the circumstances connected with the collision which occurred on the 22nd ultimo at Queen Street station, Glasgow, on the North British Railway.

In this case the 7.10 p.m. express train (consisting of three incline break waggons, 13 vehicles, and two engines), after descending the incline of 1 in 45 leading from Cowlairs to Queen Street station, came into collision with the buffer-stops at the end of that station.

Four passengers complained of being shaken.

There was no damage sustained by the passenger carriages or incline break waggons, but a coupling between the two engines was broken.

The buffer-stops were slightly damaged.

Description.

The distance from Cowlairs station to the buffer-stops at Queen Street station is about $1\frac{1}{2}$ miles; 200 yards at each end are more or less level, the remaining $1\frac{1}{4}$ miles consisting of a falling gradient of 1 in 45, a large portion of which is a tunnel. All trains are stopped at the top of the incline (the engines having previously left them), and worked down it by incline break waggons weighing about 14 tons each, the ascending traffic being worked by a rope. In consequence of the extremely limited accommodation in Queen Street station, it is stated to be necessary that sometimes one engine, and at other times two engines should be attached to the rear of descending trains in order to be in readiness to proceed with outgoing trains. The station is now being enlarged, but I regret to hear that the improvements, when completed, will not permit of this very objectionable practice of attaching engines to the rear of descending trains being discontinued.

The time allowed for the journey from Cowlairs to Queen Street is eight minutes, or an average speed of $11\frac{1}{4}$ miles an hour. A rule in the rule book states, that trains or engines going down the tunnel are never to exceed in speed 10 miles an hour, and therefore must always occupy at least five minutes in passing from Cowlairs to Queen Street; the second part of the rule, therefore, allows an average speed of 18 miles an hour to be maintained, though the first part limits it to 10 miles an hour; or looking at it another way, the first part of the rule requires nine minutes for accomplishing the distance which according to the second part is not to take less than five minutes. It will be scarcely credited that though the extraordinary discrepancy between the two parts of this rule was pointed out in a report on an accident which occurred at the same spot two years ago, no change has yet been made in the rule.

Evidence.

1. *William Hay*, incline breaksman from Cowlairs to Queen Street eight years.—I came on duty at 11 a.m. for 11 or 12 hours. The 7.10 p.m. from Edinburgh was a few minutes late, and I joined the front of the train at about 8.30 p.m., and had charge of two tunnel breaks of about 14 tons each, there

being a third break behind mine in charge of Alexander Frizzle. There were 13 vehicles in the train. The tunnel breaks were attached in front of the train before it left Cowairs station, and we were pushed to the head of the incline by two engines going down into Queen Street. The general way is for one or two engines to go down behind all trains; they ought, according to Rule 540, to be coupled to the train. Although Rule 537 says that there should be one break waggon to eight carriages—the London carriages being generally heavy, I thought it better on the present occasion to have three breaks than only two. It is an understood thing that the engines are to look after themselves as regards breaks. We do not at all depend upon the guard's breaks for the descending journey. Almost at starting I felt that we were going too quickly, and I put sand down before entering the tunnel mouth about three-quarters of a mile from the top of the bank; the speed at this time was not much more than usual, but I felt that I had lost control of the train. I in consequence told my mate to go into the break-van next the last tunnel break and apply the break, which he did just before entering the tunnel. I did not, however, feel that this made any difference. I do not remember trying to gain the drivers' attention before entering the tunnel, hoping that the application of the guard's break might control the speed. The speed did not increase through the tunnel, but I felt that there was no means of checking it unless I could attract the drivers' attention at the Queen Street end of the tunnel. On reaching the Queen Street end of the tunnel the speed however diminished considerably, so much so that I told my mate to take off the guard's break, and I myself eased my mate's break, fearing that there would not be speed enough to carry us to the buffer-stops. When about half-way up the platform, I felt a sudden increase of speed as if we had been pushed from behind, my two breaks being still on, and I still standing in the third break waggon. I at once put the break on again, but I could not stop the train before it struck the buffer stops at a slow speed. My mate at this time was back in his break. We neither of us jumped off, though we could have done so and kept on our feet. One side of the buffer-stops was cracked. The breaks were not injured. The engines were still at the back of the train, close up to it, when we stopped. I did not ask either of the drivers why they had pushed us. It is customary for the engines not to be uncoupled until the train has stopped at the platform. The rails were in fair order. The break power we had ought to have been sufficient to hold a train of 18 vehicles.

2. *Alexander Frizzle*, spare goods guard.—I have been acquainted for five years with the mode of working the incline into Queen Street, where I have often been employed as breaksman. I agree with Hay's evidence. I felt the increase of speed just on reaching the platform, and I had time before reaching the buffer-stops to re-apply my break, which my mate had partly done and was then working at his own. I had left the guard's break just rubbing. We ran into the buffer-stops at a quick walking pace. I did not jump off.

3. *William Fairley*, driver about 30 years.—I joined the tail of the 7.10 p.m. train from Edinburgh at the top of the bank while it was standing there waiting to go down. The fireman coupled me on. Two or three minutes afterwards Walker's engine came along and joined mine, coupling on. We then started immediately. As we started, the coupling between my engine and Walker's broke in the long link. It was the coupling at the front of my engine that broke. Walker's engine was on the level, and the sudden snatch of the train starting broke the coupling. I did not feel any effect from the fracture of the coupling. I applied my tender break alone to enable Walker to overtake me, which he did, and his

fireman again coupled on with the screw coupling from the front framing of the engine. I kept the tender break on all the way down the bank, and I did not observe that the speed was more than usual. I had no intention of uncoupling before the train came to a stand, which it did at the buffer-stops at Queen Street. I felt very little of the blow with which they were struck. I had not slackened my break in the least, and can see no reason for the increase of speed after reaching the bottom of the bank. I did not feel Walker give any push after the train had stopped. The coupling between the engines again broke, I suppose, owing to the rebound, which however was not much. I had received no signal from the breaksman to help him down the bank. I might have seen such a signal before entering the tunnel. We are ordered to break our own engines down, and in case of need we give assistance to the train. There was no damage to either engine. I was about 50 yards down the incline when Walker coupled on the second time. He did not come in with a bump.

4. *Peter Preston*, fireman four years; with Fairley for about 10 months.—I agree with driver Fairley's evidence.

5. *John Walker*, driver 25 years.—I joined the Edinburgh train at the top of the incline, coupling on to Fairley's engine, which was already there. My fireman coupled me on with Fairley's engine coupling. We stood scarcely a minute before starting, my engine being just at the top of the bank, on the level. When the train started my break was off, but the coupling broke just as the engine got into motion. I was obliged to give the engine steam to keep it up to the other engine, and the fireman immediately coupled on again, using my tender screw-coupling. Nothing occurred to attract my attention as we went down the bank. I put on my tender-break as soon as the coupling was on, and I never took it off till we reached the bottom of the tunnel, when, as the train was going slowly, I had the left tender-break (the tender has two breaks) eased. The train then continued to go slowly on, and I did not know we should strike the buffer-stops till we did so. The coupling then snapped again, owing, I believe, to the recoil after striking. I don't know whether Fairley eased his break as well as myself. The signalman allowed me to join Fairley's engine on my telling him I was going to be driver of the 8.50 train to Edinburgh. I am not aware of any rule against two engines going down together in rear of a train.

6. *George Thomson*, fireman four years; only one day with Walker, his own regular fireman being off for the day.—I agree with Walker's evidence. I eased my break by the driver's direction just before we struck the buffer-stops.

7. *Jesse Basset*, guard 35 years.—I joined the 7.10 p.m. train from Edinburgh at Waverly station. We started at right time with 18 vehicles. Of these we detached five at Polmont junction, which we left at 7.44 p.m., 3 minutes late. The train was fitted partly with the Westinghouse break, but from my van at the rear of the train there was no control over it. We arrived at Cowairs at 8.13, one minute late, and left at 8.18, also one minute late. We were then detained at the bank head seven minutes. The speed in descending the bank did not attract my attention, and I did not apply my break till after we had struck the buffer-stops at a very slow speed. At the Glasgow end of the tunnel I thought the train would hardly reach the buffer-stops, but directly afterwards I felt the engines give my van a sharp jerk, which sent the train forward. I had not time to apply my break, except to stop the recoil of the train after the collision. We arrived at the platform at 8.30, having left the bank head at 8.25. I had felt a shock at the top of the bank on the train starting, but I felt no second bump.

Conclusion.

This collision (a second of the same nature within 17 days) of a train consisting of three incline break waggons, 13 vehicles, and two engines, with the buffer-stops at Queen Street station was the natural result of sending engines down the incline attached to the rear of passenger trains, any want of unanimity of action between the breaksmen at the head of the train and the driver or drivers at the rear being tolerably sure to end in some mishap. At the commencement of the descent of 1 in 45 the coupling between the two engines gave way, a great strain having been brought on it, owing to the rear engine having been standing on the level. This fracture, no doubt, led to the front of the train getting a forward impetus, and to the breaksmen in charge feeling that he had lost proper control of the train. This control, however, he appears to have regained on reaching the bottom of the incline, and he was so fully under the impression that he had done so, that fearing he would not have sufficient impetus to gain the end of the platform line at Queen Street station he released the blocks from one of the incline breaks, and told his mate to do the same with those of the front van, which latter break had been applied when the speed was found to be too high. It must have been just at this time that the driver of the rearmost engine, also thinking the speed so slow that they would not reach the buffer-stops, had his tender break partly released, and hence the collision before the incline breaksmen had had time to counteract the effect of the release of the tender break of the rearmost engine.

As I before stated, the accommodation at Queen Street station is so very limited, and the time occupied in descending from Cowlairs (where the engines are kept) to Queen Street so great, that the traffic could not be worked without resorting to the expedient of sending down engines (sometimes one, at other times two) at the rear of passenger trains for the purpose of being attached to departing trains.* Queen Street station is now being enlarged, and although when the improvements are completed it will, I am informed, still be necessary to send engines and trains together down the incline, there will be, it is to be hoped, sufficient accommodation to enable the engines to be sent down at the front instead of at the rear of the trains. In all possible cases they should even now be sent down in front of the trains.

It is greatly to be regretted that the alterations in Queen Street station have not included the alteration of the incline of 1 in 45 to one on which the traffic could be more readily managed. The working of the trains, even when the improvements are completed, will still be a subject of difficulty and danger.

I would again call attention to the great inconsistency of the rule as to speed and time between Cowlairs and Queen Street, and again suggest that it should be altered.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
C. S. HUTCHINSON,
Major-General R.E.

* It is necessary to attach engines to the front of departing trains as a precaution against accident in case of the rope which hauls up the trains breaking, and also to save delay at the top of the incline.

Printed copies of the above report were sent to the Company on the 28th July.

SOUTH-EASTERN RAILWAY.

Board of Trade, (Railway Department,)
Leeds, 14th June 1879.

SIR,

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in the Order of the 27th ultimo, the result of my inquiry into the circumstances which attended the collision that occurred at Tunbridge station, on the 24th ultimo, between a shunting engine and a passenger train.

Four passengers complained at the time of the collision of having been slightly shaken, and the number of claims which have been sent in to the Company altogether amount to 14, but it is believed that there are no serious cases. The fireman of the up passenger train was bruised, but not laid up.

The buffer-beams and buffers of the two engines were both broken. The shunting

engine had the slide spindles bent, frame bent, boiler sprung at leading end, left driving crank pin loosened, and the crank-axle, life-guards and frame stays bent, and the trailing end frame damaged. The passenger train engine had the valve motion bent, steam chest and cylinder covers broken, boiler sprung at leading end, inside and outside frames bent, and the foot-plate damaged.

Description.

At Tunbridge station the up and down platforms are situated alongside of two loop lines, and besides these loop lines there are up and down main lines between the loop lines for the non-stopping trains to pass through the station without delay. At the eastern end of the platforms there is an over-bridge which carries a public road across the railway nearly at right angles to it, and the facing-points on the up main line, where the up loop line commences that leads to the up platform are situated about 72 yards east of the eastern side of this bridge. The signal-box at the east end of the station is close to this pair of facing-points.

About 100 yards east of this signal-box there is a cross-over road from the up to the down main through lines. The shunting engine was standing on the up main through road about 40 yards west of the facing-points leading to the up platform, but clear of the up line to the platform, waiting for an opportunity to get across to the down main through road by the cross-over road to which I have referred.

From this over-bridge the up main line is perfectly straight for a very long distance, so that the head light on the up passenger train engine might have been seen if the driver of the shunting engine had looked for it.

The regulations which govern the shunting at Tunbridge station are as follows:—

“Yard shunting (hand-signals, &c.):

“All drivers, firemen, guards (passenger, goods, or ballast), shunters, &c. must be very careful as to shunting, as most of the points at each end of the Tunbridge yard are now connected with the signal-boxes, and a proper hand-signal must therefore be obtained from the signaller at either box before any shunting is commenced.

“It is most important that drivers, guards, shunters, and all others concerned in shunting, should take care to see that the engines and all vehicles are well clear of the points before shunting back or over any of the lines.

“In order to guide the shunting, and to prevent drivers and others taking a wrong hand-signal, the following station arrangements have been approved of for the exhibiting of the hand-signals from their signal-boxes for the shunting work on the main line.

“EAST END YARD SIGNAL-BOX.

“To shunt Out down the Up Main Line	}	A Green Flag or Light from centre window.
“To shunt Out of the Down Through Main Line	}	A White Flag or Light from centre window.

“All the above hand-signals will be seen as looking *from the station* towards either signal-box.

“Each signal-box has three distinct windows on the station side, and the hand-signals as above described will therefore be given from one of those windows.”

I have omitted five other paragraphs as they do not apply to this particular collision, and I have not quoted those which concern the west end yard signal-box for the same reason.

The first of these instructions was applicable to the shunting engine on the up main line, which caused the collision; the second had reference to another pilot or shunting engine which was on the down through main line.

Evidence.

William Whibley, engine-driver nine years, and 20 years altogether in the service of the South-eastern Railway Company, states: I was driving pilot engine No. 99, used for shunting purposes in the Tunbridge station yard, on the 24th May. About 8.45 p.m. I had brought a number of mixed trucks from the sidings off the down line on the eastern side of the station, and had placed them on the up through straight road, and another pilot engine had taken these trucks from the up straight road and had placed

them in the sidings off the up line, also east of the station, and left them ready in the sidings to be taken away. My engine then stood on the up straight road on the eastern side of the over-bridge that carries the public road over the line, and it stood on the up line between the signal-box and the over-bridge waiting. I had to go into the down sidings to marshal some more trucks for a down goods train, but I was not to cross from the up to the down main line until the down Dover mail train had passed, and I was then to

cross. At the time I was thus waiting the fireman was not with me on the engine. About 9.20 p.m. (the down Dover mail being due here at 9.16) the ground switchman came to me and said that I was not to wait for any more trucks, but that I was to follow the mail, as there was a lot of work to do on the other side, *i. e.*, the down side. The down mail train had gone when the switchman came to me; he was crossing to me when the mail went on,—the usual practice is for the ground switchman to ask the signalman in the box whether the engine could cross, but I cannot say whether he did this that night or not,—then he said to me, "Right over," and I started without looking for any signal from the signal-box. I had started, and I looked up and I saw a white light from the middle window of the signal-box. I knew that that white light was not for me, and I reversed my engine at once, in order to get back out of the way, but I was too late. My engine had stopped when the engine of the up train came up and ran into it. The right buffer of my engine and the buffer-beam were broken, but the engine was not thrown off the rails, and my engine was knocked back about 20 yards beyond the other side of the bridge, as I had the steam on to run the other way. Mine was a tender engine. I was running at the time of the collision with the engine in front. The fireman was not on the engine when the collision occurred. I had a red light on each end of my engine. I saw the up train engine had a white light on the top of the smoke-box when it was not more than 50 yards from me; this was after I had started.

George Avery, assistant shunter about five weeks, and three years and four months in the Company's service, states: I was on duty on the night of the 24th May. I had orders from shunter Stephens to come over and tell the driver of the pilot engine, W. Whibley, to get over to the other side, the down side, as soon as the down Dover goods train was gone. I came across and told the driver to get over into the siding as soon as the Dover goods train was gone, and when I had told him, I then got on the engine; that is, I had one foot on the foot-plate and the other foot on the top step. I got on from the down or six-foot side. The engine then moved forward, but I did not feel it move forward; and I was not aware that it was moving forward until the collision occurred. I did not give the driver any order to move until the goods train had gone. I did not tell him that the Dover goods train had not gone, as it could be seen standing there. I did not tell him to go as soon as the down Dover mail train had gone; but that train had gone before the collision occurred. The signalman in the signal-box called out to the driver, "For God's sake, go back." The engine-driver reversed his engine after the signalman had called out for him to go back. I had not seen the up train coming, but when the signalman called out I jumped off the engine. It was a fine night and clear. The fireman was not on the engine. I did not see him at all until after the collision had taken place. There was a white light in the centre window of the signal-box. I did not know what that signal meant.

William Wood, ground switchman 10 years, and 15 years in the Company's service, states: I was on duty on the night of the 24th May. I don't know anything of the circumstances that led to the collision. It is not in accordance with the practice in the station yard, when a pilot engine wants to cross from the up to the down line, for the ground shunter, or anyone acting for him, to go to the signalman and ask permission for the pilot engine to cross. The per-

mission to cross is always given by a signal light at night, placed in one of the windows in the box. If the pilot engine had to take trucks across, the ground shunter would then go to the signal-box and obtain the signalman's permission, but the signal to the driver would be by a hand light.

John Huckstep, engine-driver 15 years, and 25 years in the service of the Company, states: I was driving No. 26 tender engine in front of the 7.30 p.m. up passenger train from Dover on the night of the 24th May. My train consisted of an engine and tender and 19 vehicles. It was due at Tunbridge at 9.15 p.m., and that night it was four minutes late. As I approached the station the signals were all right for me to enter, as we were appointed to stop there, and I did not discover that anything was wrong until we had nearly reached the signal-box, when I heard the signalman calling out, when we might be travelling about 18 or 19 miles an hour. We struck almost immediately after seeing the engine in front on the same line. We had had the signals off all the way, and the steam was off when the collision took place. I had no time to reverse the engine or to do anything towards stopping the train. Both buffers and the buffer beam in front of my engine were broken, the left cylinder cover and the left piston head were also broken, but no vehicles were thrown off the rails; one coupling was broken about the middle of my train. The pilot engine had a red light in front on the right buffer beam. I was not hurt; the fireman was bruised, but not laid up. We were both on the engine when the collision took place. My engine was disabled, and the train was taken away from it, and I believe most of the carriages were taken on. I saw a red light on the engine, but I thought it was standing farther back, quite clear of the crossing, into the platform line.

Thomas Green, signalman 26 years, and 30 years in the service of the Company, states: I was on duty on the night of the 24th May. The down Dover mail trains run through Tunbridge station without stopping, and I received the signal for it at 9.14 p.m., and it passed my box about 9.20, and the collision occurred about a minute or two afterwards. I had not given any signal for the pilot engine to come forward, but I had taken off the signal for the up passenger to enter the station. Sometimes I let a pilot engine cross without being asked by any of the shunters for permission to do so, but they generally do ask; but the engines do not cross without getting permission from me, by the exhibition of a signal in the window of the signal-box. I tried to stop the pilot engine from coming forward by showing a red light towards it and calling out, and it had just stopped when the collision occurred. The pilot engine whistles when they want to cross, and when it is clear I can and do let them across, without being asked at all times for permission to cross.

George Willmott, station-master at Tunbridge on the night of the 24th May, states: I was on duty when the collision occurred. I heard the blow. I knew where the pilot engine was standing, and that it must have been moved, as it was standing clear of the up platform line. Within an hour of the occurrence the engine-driver, Whibley, admitted to me that he moved the pilot engine forward, having mistaken the light in the middle window of the signal-box, but did not say a word about the assistant shunter. The movements in the shunting of trains are governed by the signals exhibited in the window of the signal-box.

Conclusion.

From the preceding statements it appears that as the 7.30 p.m. up passenger train from Dover to London, consisting of an engine and tender and 19 vehicles, was entering upon the line leading to the up platform at Tunbridge station, where it was

appointed to stop, by means of the facing-points close to the signal-box at the east end of the yard, the signals being all right for it to enter the station, it came in contact with the shunting engine which had been most improperly shunted back along the up main line towards the facing-points, until it was foul of the line leading to the up platform.

The shunting engine was on its way towards the cross-over road to the down main line, and thence to the sidings off the down line which are entered by a pair of trailing-points a little further to the east, and the driver, when before me, stated that he was moving back because he had been told to do so by the assistant shunter in the yard as soon as the down Dover mail train had passed through the station, and that he did not discover that he was doing wrong until he observed a white light in the centre window of the (East Yard) signal-box, and then he reversed his engine, and endeavoured to get back clear of the line on which the up passenger train had to pass, in order to reach the station up platform. He succeeded in stopping the engine, which was run into by the up passenger train travelling at the estimated speed of 18 or 19 miles an hour. But it appears that within an hour of the occurrence he had admitted to the station-master that the collision was caused by his having mistaken the white light which was exhibited in the centre window of the signal-box for a signal for him to shunt back along the up main line, whereas this white light was, according to the instructions, a signal to a shunting engine that was on the down main line.

Again, the assistant shunter entirely denies having told the driver of the shunting engine to follow the down Dover mail train, but states that he did tell him that he was to shunt when the down Dover goods train, which was then standing in the yard, had left the station.

However, nothing could be clearer than the instructions as to the hand signalling for the shunting of trains which I have quoted, and I have only to add that this collision was evidently wholly due to the gross carelessness and neglect of the regulations on the part of the driver of the shunting engine in moving back towards the signal-box on the up main line, when in addition to the absence of the green signal light in the centre window of the signal-box he might, if he had looked ahead, have seen the head light of the up passenger train advancing rapidly towards him on the long length of straight line.

The Secretary,
(Railway Department,) Board of Trade.

I have, &c.,
W. YOLLAND,
Colonel.

Printed copies of the above report were sent to the Company on the 2nd July.

LONDON :

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